

AVIATION WEEK

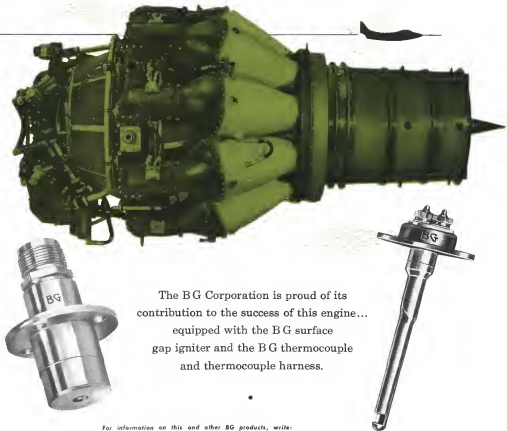
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NOV. 26, 1951

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NEWS DIGEST

DOMESTIC

Headline damage has been filed against **deposed** Air Line Pilots Assn President **David L. Belts** by ALPA's board, alleging illegal acts. The board's complaint also says that Belts spent \$600,000 on union funds for a new headquarters building although he was said to have been authorized to spend only \$425,000.

Northwest Airlines is negotiating with **Hydra Air, Inc., Zurich**, for 100,000 **aircraft** **shelving** units for its fleet of ten Boeing **737s**. NWA has been authorizing the installation on a **Shelving** for some time (**AVIATION WEEK** June 4, p. 49).

Donald Webster, Washington general manager, has been appointed **manager** of **National Instruments Assn.**, following his resignation as president of NAA at a recent directors' meeting at **Omaha**. **Joseph T. Gering**, manager of the **Aircraft Instrument Assn.**, **Practical Aircraft Council**, who had been an NAA vice-president, will serve as acting president until a successor to Webster is picked at a meeting in **January**.

Quebec National Airways C-54 crashed, killing crew of three, after collision with **California Eastern Airways** C-54 near **Oakland Airport** Nov. 17. Cal Eastern's plane landed safely. No passengers were aboard either plane.

Mr. Gen. Joseph Smith, former director of **Air Force Plans**, HQ, USAF, has been named commander of **Military Air Transport Service**, succeeding **Gen. G. Lawrence B. Kuter**, who has been assigned to USAF Headquarters as **Deputy Chief of Staff**, Personnel.

Robert C. Northrup, vice president of **Pratt & Whitney**, Inc., **Windsor-Holm, N. C.**, was elected president of the **National Aviation Trades Assn.** at the P. Worth annual meeting. He succeeds **John G. Quinn**, who was made vice president-training activities. **Joseph H. Hoot** and **Harold Hoot** were also named vice presidents. **David Finger** was made treasurer; **Charles Parker** was reappointed executive director.

Dr. Harold E. Mohr, supervisor of CAA's aviation development education program, has been inducted as 1951 winner of **Frank G. Brown Trophy** for contributing most development of the youth in the field of education and training. Award will be made Dec. 17 at **Aero Club dinner** at **Hotel Statler**, **Washington, D. C.**

Carroll B. Vickers, 55, aviation and automobile design innovator, died Nov. 7. He once operated the **Vickers Mfg. Co.**, **Boston Harbor, Mich.**

FINANCIAL

Solar Aircraft Co., San Diego, has declared a regular quarterly dividend of 15 cents a share and an extra dividend of 5 cents on its common stock, with payment Jan. 15 to stock of record on Dec. 11.

Philippine Air Lines reports a net profit of \$1,211,030 for the first nine months of 1951, a 175% increase over the same period last year. Operating profit for the current period was \$11,365,296.

Kellett Aircraft Corp., Camden, N. J., reports a consolidated operating profit of \$185,002 for the nine months ended Sept. 30.

United Aircraft Corp. had a \$5,497,291 net income on sales of \$288,513,291 during the first nine months of 1951. Net income for the third quarter was \$2,459,378 on sales of \$107,290,719. Earnings for Sept. 30 was about \$1.3 billion. A quarterly dividend of 50 cents on UAC's common stock was declared, payable Dec. 10 to holders of record Nov. 21.

Colonial Airlines reports a net profit of \$1,005,000 for the first nine months of the year compared with a loss of \$167,300 incurred during the same period last year.

Republic Aviation Corp. has declared a 75-cent-a-share dividend payable Dec. 14 to holders of record Nov. 30. A 15-cent per-share dividend was paid in April.

Western Air Lines reports earnings of \$1,185,321 during January to September—on 30% gain over the same period last year despite loss of nearly \$1 million in overhead during a 15-day mechanical strike.

INTERNATIONAL

A. V. Roe Canada Canada jet engine is to be fitted with an afterburner made by **Solar Aircraft Co.** The Canada is scheduled to fly in 1952, with 7,000 lb. of thrust capacity.

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AVIATION CALENDAR

Nov. 26/30—Meeting of the American Society of Mechanical Engineers, Chautauque Hotel, Atlantic City, N. J.
For information write: Ernest Hartson, 28 W. 39 St., N. Y. 18, N. Y.

Nov. 27-30—Arctic Delegates and Man-
glarymen Ann. meeting, Waldorf Astor
Hotel, New York.

Nov. 16-18—National convention of the American Rocket Society, Aflacit Corp., M. I.

Dec. 4-5—Transport aircraft hydraulic assembly and system components, sponsored by Vickers Incorporated, Hotel Sheraton Detroit

Dec. 67—Feedback Controls System, Gladstone-Holden Hall, Atlantic City, N. J.

Day 17—Wright Brothers Lecture, sponsored by the Institute of the Aeronautical Sciences, U. S. Chapter of American Astronauts, Washington, D. C.

Dec. 17-18/night Memorial Luncheon, principal speaker, Mayor Alexander F. de Sorensen, Hotel Casbah, Nags Head, North Carolina.

Jan. 5-6, 1952—Annual Miami Air Show, sponsored by the Florida Air Pilots Ass., Opa Locka Airport, Florida

Jan. 64—Annual Census Distribution Meeting, Alta floor, Wichita, Kansas

Jan. 20-Feb. 1-11th Annual Meeting, the
Institute of the Acoustical Sciences,
Acoustical Society, New York

Jan. 29-Mar. 14th National Meeting of the
American Meteorological Society, Room
501 Hotel, New York

Block 3-6-Institute of Radio Engineers,
Walden Avenue, Room 4, Grand Central
Palace, New York

March 17-19—Second Midwestern Conference on Fluid Mechanics, to be held at Ohio State University.

March 17-22—American Society of Test Engineers, International Amphitheatre, Chicago, Ill.

April 11-14—National Aeronautic Meeting and Aircraft Engineering Display, Society of Automotive Engineers, Hotel Statler, New York

PICTURE CREDITS

8—(2,6,8,11) Boreas & Levy, (Absorption)
Murchamp Alkali (P.W.) London;
(Transpiration) Douglas Alkali Stone, 11
—C F Stone, 12—Pharmaceutical
Div., 13—Coulter Photo., 14—Wynn
Fisher, 15—Wm Wm, 16—(LAP), 17—
London, 18—L.A.



FRI NISH ULTRA LIGHTS—Two lightplates, *Zeeo*, the D 9 (left) and the D 111 (right) are products of Arima Jodo. Single-out D 9 has 14 lbs. ABC Rearing, weighs 994 lb. gross. Litter, two-phase D 111 has 70 lbs. Mass. Both are designed to be built from kits.

Picture Highlights of the Week



SCORPION FIRESTICKS.—*Scorpiocentrus* spp. [old] of Northeast F-39 Scorpion created when plant crushed on aluminum fitted to glass's. Allison [35-71] captures. Flame extends about 11 in. behind the tailpipe. The big two-water unit the afterburners in heavy (thick), clouds, and the short burst of speed during combat. In the 600 mph class, the Scorpion carries an 20 mm cannon, can climb to over 40,000 ft. Several F-39 squadrons are in service with interceptors made up the West Coast.



NEW 14F TANK STYLE—Lockheed F1V5 (right) sports recently developed, fixed, center-mounted wingtip tanks which are said to improve the Neptune's stability. The fins are designed to guide the twin ends of the plane upon release. Tanks from next test models' production version will house fuel, radar gear or a morpholine. The bright-pink scheme aids tracking when tanks are dropped during tests. Lockheed put in about 2,500 engineering man hours in developing these ones.

DOUGLAS "TROOPMASTER"—Long column of white streamers from open nose of a Douglas Globemaster II. One flight covered 100 acres, with left half 600 yards, streamers, often, burning bags, and bags and clouds, plus 4,000 gal fuel. Gross weight was 157,600 lb.



INDUSTRY OBSERVER

► USAF is preparing to switch over to a new intermediate vapor pressure fuel designated JP-8, for jets. It will replace JP-5, currently used, when present contracts run out next year. JP-8 has a higher vapor pressure and is prone to boil off at altitude. Use of the new fuel will require only minor adjustments to engines.

► American Airlines probably will be the first of several airlines to give a commercial tourist to Shell Oil's trisulphophosphate, new fuel additive, which is designed to lessen sparkling fouling. The new compound has been tested by military services for the past eight months, apparently successfully.

► Douglas Aircraft Co.'s supercavitating, high-altitude X-3 research plane, powered with a Westinghouse J-60 engine is already sold out, and is due to fly in January. At the controls will be Bill Budgeman, who recently piloted the D5554H Skyrocket, Navy research plane, to new altitude and speed records. He now is studying the X-3, preparatory to test flight. It is estimated that its performance will exceed considerably that of the D558-II.

► Ford, General Motors and Hudson reportedly are looking their way toward entry into the helicopter business as licensees for the whole machines or subcontractors for principal assemblies. This indicates large-scale production, well beyond the modest quantities of present helicopter plants, may appear in the military picture soon. Principal subcontractors now are Goodrich Aircraft and Twin Coach Co., who are making fuselages for Panache's H-21 and HU-19 helicopters.

► First joint military specifications for a synthetic lubricant for aircraft gas turbines is designated MIL-L-7565. The lubricant is designed to withstand operating temperatures from minus 65 to plus 900 deg. F. At the low temperature, it is described as about one-third the viscosity of the best petroleum-based lubricants. And at the peak temperature, it is about 1/700th as viscous as petroleum base lubricants. Initial development work on the lubricant is credited to the Naval Research Laboratory, followed by a joint Bates, Air Force and Industry Research program. Cooperating were Ralston and Hsu, Enery Industries, du Pont, Ohio State, Flack-Kellogg Chemical Co., Caltech and Caltech Chemicals Corp., Standard Oil Development Co., Tenn. Co., Shell Development Co., and California Research Corp. Lubricant base is an aliphatic ester, to which are added phosphorus and trisulphophosphate. Its high cost and relatively short supply will prevent widespread commercial use. It is not expected to replace petroleum products, except where military applications require its lubricative characteristics. Now it is likely to be available for reengineering aircraft engines.

► Two principal remaining problems of test aircraft, Convair and Fitter aircraft have accepted responsibility from CAA for testing and certification of their own planes in a class which weighs not more than 5,000 lb. and carries not more than 5 persons. The arrangement has been sought by airlines for several years, but has been delayed because of disagreement over terms under which CAA would remove its own testing and certification responsibilities and let the manufacturers stand back at their own products, under a system of delegating the manufacturer's employs to supervise testing and certification to the CAA.

► Prototype studies on future local service airplanes have reached a stymie point, some sources close to CAA report, because U. S. manufacturers don't think such a plane can be built at a profit at 1951 unit levels. It boils down to the fact that the deperished Douglas DC-3 still does a good enough job for short hauls so that it is hard to beat per seat mile, especially at a competitive purchase price. Further exploration by military interests into new airplane types, such as assault transports that ought to be converted to commercial use, appears still the only immediate hope for a new local service plane development. This is especially true since future prospects for large helicopters are cutting into the feed-line local service plane's potential utility.

WHO'S WHERE

In the Front Office

W. B. Anderson, former manager of Westinghouse Electric's Gas Turbine Division, has been appointed assistant to the executive vice president, defense products. His previous post was being filled by Frank L. Sepler. E. C. Bergoff was named manager of engineering, defense products. R. M. Brown has been made sales manager, and M. A. Dolbert has been designated manager of production in this department.

Gardner (Shelby) Gray has been made assistant to the president of Massachusetts Aircraft Co. Gray continues vice president at Glenn L. Martin and executive vice president for McDonnell Aircraft. His aviation experience dating back to 1937.

Charles E. Hanchett, manager of station ground services for United Air Lines at Chicago since 1946, has been named assistant to the vice president-transportation services, and will headquarters in Denver.

Changes

Henry J. MacDonald has been appointed production manager of Kaiser Aircraft Corp.

Ronald S. Gail has been appointed manager of public relations for Calsco-Wright Corp. and its divisions. He previously held a similar post in C.W.'s Propeller Division.

John N. Easte, formerly president of Henry A. Carter, Inc., Philadelphia, has joined Fairchild Helicopter Corp. as subcontract manager.

N. E. Rowe is leaving British European Airways Corp., where he was controller of research and general development, to join Blackburn & General Aircraft Ltd., as technical director.

Manasse Hays has joined Lockheed Martin Co., San Gabriel, Calif., as application engineer on development of F-104 jet single seat advanced operations equipment.

Charles E. McConne, former Ford also manager, has joined Westinghouse Research & Mfg. Co., Buffalo, to handle customer relations.

Frank Purdie has been designated assistant sales manager for Air Associates Aircraft Products Division at Teterboro, N. J.

Alexander G. Duguid has been appointed sales manager for Field Aviation Co. Ltd., Ottawa, Canada, aircraft seating and supply firm.

James G. Jones has been named chief administrative officer in Pittsburgh Air Lines in the U.S., to manage an other university of the Avian Corp., headed by Col. Andrew Jackson, president of FAL.

Richard J. Wells, Jr., has been named acting state director of members by the California Aeronautical Councilman, until a successor to Warren B. Curry, former director, is chosen.

Named to the Board

Bernard W. End has been named to the board of directors of Helikopters, Inc. He is also a director and vice president of Flyte & Co., Inc., and a vice president of Pacific Lighting Corp.



39 out of the 46 Boeing Stratocruisers now in service or on order for U. S. airlines depend on Hamilton Standard Hydraulic Propellers. In fact, Hydramacs now are specified for 86% of all U. S. transports.



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Washington Roundup

Global Air Navy?

Navy is trying to make a comeback led in the U. S. "first line of defense"—not as a military battlefield navy defending two oceans, but as an air navy blanketing the globe.

The two factors behind Navy's new bid:
• **Adm. William Fichteler** who recently took over the helm as Chief of Naval Operations.
• **Tactical Advances** multiplying the striking power of the Naval air arm. They are testing the limit on which the U. S. has relied solely on the strategic air arm to deliver atomic retaliation. In a few years, Navy will be operating 1,700 ex-radius-of-action (cross-bound) planes of the F-4 Phantom II to make an atomic thrust at any point in the globe. Navy already has other atom-bomb-carrying planes in service.

That is how the Navy's top command views the situation.

In any all-out war, Naval air would bear the initial blast. Besides, we can project the full impact of U. S. strategic air might and land power to an enemy, the seas and seas—which make up seven tenths of the earth's surface—must be closed. And that's the Navy's mission. Only after the skies and sea lanes are closed, largely by a global air Navy, can aircraft bases and troops continue to get logistic support.

But the top Pentagon brass doesn't see it that way. It counts on Air Force to bear the initial blast of air defense and offense.

Navy's strategic success, so far, in convincing the military command is evidenced in the build-ups that seem likely.

- A 70% boost in USAF's strength—loses 95 to 145 wings.
- Only a 15% boost in Naval air strength—loses 14 to 16 at 17 in some groups, plus a "light" increase in patrol wings, a modest build-up of Marine aviation from 10 wings to 5 wings. Navy and the air wing acquired the 14 wing-group strength it had in 1949. It had dipped to nine wing groups in 1959. Navy wanted at least 20 groups, the Marine Corps at least five wings.
- The seven Navy's air arm will still spend that around the globe.
- With 180 planes to a group, there will be only a 1,600 plane Naval air striking arm.
- With 216 tactical planes to a wing, Marine Corps will have only a 568-plane force to meet aggression at any point on the perimeter of the Russia-dominated land mass.

Outlook on Naval Aviation

• **Production**, once selling in a year? The Naval aircraft program is about four months behind schedule. Boer's chief, Rear Adm. Thomas Corbett, estimates backlogs in engines and structures will not substantially increase next summer or fall.

By then, Budget experts to have capacity to meet its requirements working one-half. Aside from expansions already underway, only some expansion in facilities for components production will be necessary to meet this goal.

• **Air-powered plane**, Navy may think the nuclear aircraft engine is "a step" in a long haul. But the model Consolidated Vultee Aircraft Corp. is building

for the Air Force will be of the land-based variety.
• **Global mission**, Navy, which is developing two of the three types given the green light for procurement for service testing by the Douglas, looks on this as still "off in the wild blue yonder." Congress won't begin only a few months back on manufacturing facilities for the aircraft. Production and service testing will take "years," Navy believes.

A Jet Transport?

Industry support is building up for Sen. Pat McCarran's "interim solution" plan to open the way for U. S. production of a jet transport for international service. It's going to push the proposal when Congress opens in January.

That is how it should work. An international airline would tell CAB what type of plane it wanted to buy. CAB would okay the project for a subsidy. The manufacturer would build the plane on a cost-plus basis. The airline would pay the manufacturer the price it would have to pay a foreign manufacturer for a comparable plane, the government would pay the rest. The international carrier couldn't use this government-subsidized aircraft in competition with domestic lines.

It's responsible to the day program that has been in operation for the Midwest Marine for a decade and a half.

• **Air Transport Area**, is cutting a lively eye on the McCarran plan, making a detailed study of it and the Midwest Marine plan of re-constructing carriers set aside for construction. In the past ATA has been antagonistic to it.

Reason for the new outlook. With Congress finally working on any airline project, McCarran's proposal seems to be the only hope for government assistance in commercial jet development. It's felt that with a push, the Administration and Congress could be convinced to apply the same policy to international air that's being applied to domestic.

At least two major aircraft manufacturers report they favor the McCarran plan. Boeing Aircraft Co. and Douglas Aircraft Co. But several others are skeptical about it. There's little likelihood a commercial industry position will be reached at the meeting of Aircraft Industry Association's Board of Governors Nov. 30. The split is too wide.

What to Watch For

• **Buy Canadian**. Look for Air Force to increase sharply procurement from Canada—particularly in fighter and transport aircraft and jet engines.

The purpose is to balance the trade between the two countries, promote production dispersal. Over the past 15 months, Canada has orders with U. S. firms for over \$218 million in planes and miscellaneous equipment. U. S. over the same period contracted for only \$114 million in miscellaneous equipment from Canadian firms.

• **Cargo planes for lease**. Look for Air Force, which already finds itself with some extra cargo aircraft on its regular air arm—and since coming out of the production lines regularly to prepare leasing such planes to airlines, with a stipulation that they be returned promptly when and if a second delivery requires.

—Richard Johnson

hour on the New York-Los Angeles route.

Most extensive aircraft was drawn on the longest stage route between New York-New York and San Francisco via Tulsa—because of fuel requirements must just as that, the shorter stages would be easy. New York-Miami was carefully studied, too, because of the likely situation of the Coast for operation over that coastline run.

New York-San Francisco (black-tail) line via Tulsa comes in an hour and 45 minutes. New York-Miami route would take two hours 41 minutes.

Overseas National has planned, if it could get the Coast, to get high utilization by flying combinations of these major scheduled New York-Miami, New York-Houston, Houston-Los Angeles, Los Angeles-New York, New York-San Francisco.

Study of the routes planned under the Coast can carry load 10,000 lb. payload with required fuel margin for alternate airports and holding patterns. Oklahoma support is assigned as likely if high headwinds are anticipated on a flight to San Francisco (3,400 miles) and support requirement is over 90 deg. Then the plane's cockpit must be held to avoid stall. Chicago is not considered in the west-bound service in too short for route Coast take off.

• **Coast to the Coast** in U.S.—Direct flight route to operate the line at Coast on transcontinental and New York-Miami routes is shown on table on p. 14. Here is how Overseas National Airways estimated these costs with help of de Havilland aircraft:

- Fuel \$137.50 per hour. Stage length would top 7,415 miles (fuel 132,877 lb. or 16,773 gal.) roundtrip time 11 hours, 51 min. consumption 1,660 gal. per hour times 11 hours per gal. for Los Angeles roughly \$137.50 fuel cost per flight hour.
- Crew \$46.90. Anticipating Air Line Pilots Assn. demands for jet transport

crew pay, Overseas National used time pay and division formula now used on the DC-6. Pilot pay of \$17.50 an hour was figured, comprising with OPA's pay of \$10.00 as base for C-54 flying. Other crew increases are usually liquid—copilot \$12.50, engineer \$5.50 and two attendants \$5.50, making total crew \$46.90 an hour.

• **Maintenance** of aircraft \$18.00. With little reserve maintenance data available yet for the Coast, OPA was the DC-45 estimate of about \$18 an hour.

• **Maintenance** engines \$66.15. This is taken from de Havilland "Report on Fixed Heavy Running Costs of the de Havilland G-12 Civil Turboprop Aircraft." But OPA then estimated it for higher U.S. jet fuels and for less engine efficiency compared with de Havilland. Life cycle of 375 hours is used including No. 2 operation, which is kept anticipating CAA requirements although it has been dropped by de Havilland. The maintenance cost is figured at \$27.62 per hour, overhead cost at \$4.00 per engine or \$14,000 for 375 flying hours equals \$17.35 per hour—shipping cost is \$2.91 per hour making total of \$15.50 per hour.

• **Overhead** \$50.12. OPA figures a 14% of eight years with 28% residual value making total of \$50.12 per hour depreciation. OPA believes the Coast can be another DC-1 of long useful life, at first it is the first medium plane of its era and most simple in design, while later jet line or more than four years may be less efficient than it will be covered and more complex.

These are preliminary estimates made by OPA. A top Air Transport Assn. official, after seeing de Havilland plan reported adversely to ATA members with similar conclusions, partly drawn from the Overseas National study and 44, at de Havilland.

• **Amount** Overseas National-OPA is currently flying its five DC-6s into

service on the Pacific airlift under MATS charter, at a low figure of under \$1.20 a plane mile. It believes it can be the lowest charter cost on any Pacific line service. It has been on the list since it got as the largest loaded to start as an individual reception from CAB.

Senators Look Into AMC Job Changes

Denton—While no further federal grand jury action on alleged Air Force procurement irregularities at Wright-Patterson AFB is indicated until after the first of the year, there have been other developments.

• **Senate investigations** viewed all on a new take-getting the modes of procurement officials into high-handed positions to private industry.

• **Two persons** indicted for alleged irregularities of contracts have been arrested.

• **Aviation companies** involved in alleged contract irregularities have been identified.

• **Four additional companies** have had contracts suspended.

• **Baron Salomon-Sky**, Lyndon B. Johnson's Armed Services Procurement subcommittee, which is scanning military procurement problems, has turned its attention to better regulations.

Senators close to the subcommittee is indicated that at least four instances in which former having personnel have accepted positions with firms holding AF contracts are scheduled to be studied.

Investigative example: A letter is signed by \$5,500 a year position at Wright-Patterson to accept a \$10,000 a year job with a contractor. What the subcontractor wants to know: Was the fact that he had a credit \$2 million in contract with the firm a factor in his appointment to the job?

• **Proper Retention**—Such situations now partially anticipated when Air Force Regulation No. 30 30 30 from June 18, 1945.

Former personnel and retired officers of the aforementioned General aviation will not be permitted to deal with the Department of the Air Force as a representative capacity, as was stated including clause if the individual concerned previously considered the matter in general personal knowledge of the facts involved while connected with their service.

The same restriction is applicable to a person who is not included among war former personnel if he is directly associated in the particular matter in which with a person who is covered by the aforementioned sentence.

A Nov. 26, 1945 amendment has their procedure.

The provisions of 18 USC 238 (A) make it unlawful for former personnel.

within two years after their authorization, to procure or act as counsel, attorney or agent for procuring any claim against the United States which in which any subject matter directly connected with which the individual concerned was employed or performed duty."

• **Dodging Regulations**—These provisions have been promulgated in the past by a simple regulation, which also under investigation of Air Materiel Command. An electronics buyer, for example, could resign and become a representative for a textile firm. He subsequently as requested official to AMC and in cleared his representative work.

Once he has that clearance in hand, he can assume a position as a representative with one or more of the electronics firms with whom he has been doing business as a buyer—thus ending the two-year limitation.

All representatives have been required by AMC to file a complete list of companies they represent, together with the effective dates for each.

Meanwhile, counsel for Lawrence A. Kasser, head of two electronics companies in Cincinnati, has been given until Dec. 5 to present arguments for dismissal of federal indictments resulting from charges Kasser gave gratuities to Lester M. Kott, former buyer of electronic equipment at AMC.

• **Heck Investigation**—At his preliminary arraignment, Kott entered a plea of innocent. Both men were indicted on five counts, four in connection with alleged gratuities and the fifth for conspiracy.

Among late developments in the alleged irregularities was Air Force announcement that approximately 40 contracts with a face value of over \$15 million and involving its firms have been cancelled during the past six months.

One of the firms involved is Copell, MacDonald Co., Dayton, and two others are Kasser companies.

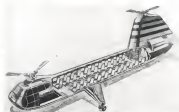
The announcement indicated AF cancelled a \$3-million contract with the Union Carbide after an investigation of changes in specifications to various lots.

• **Linked with Kasser**—The company to which it was cancelled a vital part of the investigation, details of which have been turned over to the Senate subcommittee. Copell's name was linked with that of Robert G. Hallfield, former employee in the Aero Medical Laboratory of Wright Air Development Center.

Further grand jury action before year's end is not likely. Ray O'Donnell, U.S. District Attorney for Southern Ohio, said because the jury is scheduled to meet only two more days this year.



COMMERCIAL version of the HU-16A, four passenger tandem rotor copter and . . .



44-PASSENGER HU-16A tandem on two of three civil transports in Piasecki's future plans

Piasecki's Civil Copter Plans

Three tandem-rotor military versions fit expected demands for future commercial transports.

By Alexander Vukobrat

Three tandem-rotor transport helicopters developed for the military are now by Piasecki Helicopter Corp., Meriden, Pa., are designed for civil and helicopter transport conversion, wherever the present agent military requirements permit. (See Aviation News Nov. 11, p. 13.)

Terrence Piasecki plans to take advantage of the repeated commercial helicopter transport boom of the near future (see article).

• **The two-engine HU-16A** Air Force and Army transport, which will carry 44 passengers in a cabin about the size of a DC-6 freighter.

• **The middle-sized HU-11**, also designed

by Air Force and Army as a rescue, assault and troop-carrying transport.

• **The smaller Huey HU-1A** Army HU-1A, in volume production, which will carry five passengers and is currently assigned to rescue and utility military roles.

Here is how Piasecki plans the future commercial roles of these aircraft.

• **Freelance Operations**—For off-peak schedules and low volume passenger routes, the five-place HU-1, for higher passenger traffic, the HU-11, which in some regions will carry as many as 21 passengers, entered current failure in new roles being given a narrow center aisle.

• **Airline Connections**—For regular routes, the five-place HU-1 as an aerial



HARDER NOISEMAN

latest version of the Hercules transport, made by Canadian Car & Foundry, Montreal, is the MC-119, which was shown in new official wings and redesigned, doubled fuel tanks. The aircraft was in use to be higher than the former standard fabric construction, but more

lens, at major air terminals the large H-21 is as novel as a house on wheels.

•**Short-Haul Hercules**—For very high-density routes, whether urban commuter service or military short-range transport, the 45-passenger H-16.

•**Industrial Use**—For hauling supplies or equipment to and from locations hard to reach by surface or air, and for transportation, the H-16 takes a flying crane or aerial truck role, capable of carrying eight to 10 tons in operations of 50 to 100 miles.

Both H-16 and H-21 types have had preliminary CNA certification work up to flight test stage, with models not available for the light tests because of military needs. The manufacturer estimates that "first delivery" specifies initial model or extended, those at CNA.

It is believed that certification on civil could be accomplished as fast as now. •**High-Powered Version**—Since the large H-16s but not yet done, Russia and England, say, definite statements is in certification plans for it, at this time.

The modified H-21 while it has not yet flown in its present version, is developed from two functions of approximately the same size and configuration, the Navy's all-steel HRP-1 and the modified three-engine "Flying Banana" HRP-1, world's first tandem transport "jet."

Cockpit of the PD-22, civilian version of the H-21, will have complete standard instrumentation for night by day, with automatic pilot, optional. Main cabin will be separated from pilot cockpit with lockable door. Pas-

senger cabin will be air-conditioned and soundproof, and will seat 12 passengers in deluxe airline type seats, 15 in low-type seats, or 21 in subcompact seats.

•**Maximum Range**—A converter version has a convertible baggage to separate passenger compartment from cabin and cargo storage, with quick release of things for removal of seats. With 11 passengers, it will have a range of 150 mi. with 30 tons, reserve, with 15, it will have 100 mile range with 15 tons, reserve, and with 21 passengers it will have 75 mi. range with 15 tons reserve.

A touchdown area of 50 ft. in diameter, with a surrounding 50-foot circle of clear area would be required for help-up for the PD-22, for multiple landings, a maximum distance of 100 ft. between edges of touchdown areas, to eliminate hazards of air currents produced by action of two as one engine operating simultaneously. •**Operating Costs**—A price for \$117,000 has tentatively been placed on the PD-22. Passco estimates that direct operating cost of the PD-22 would be from 68¢ cents a mile for block distance of 1.5 mi. down to 58¢ cents a mile or 85¢ on block distance.

Start rate costs shown would range from 4.6 cents for 15 seats, at 7.5 mi. to 2.7 cents for 21 seats, at 65 mi. on an helicopter hour range from 65-90 down to 160-90, depending on block distance shown. While inflated cost of replacement parts in bulk of 25% price is shown at \$404 per helicopter hour.

Comparison of operating figures of the PD-18, commercial proposed version of the H-19, shows that main costs are considerably higher as would be expected because of the smaller capacity. However, it is estimated that first cost of the machine would be \$170,000, only \$20,000 less than for the small four PD-22. Start rate cost at 75¢ cents for a converted version and helicopter hour cost is at \$17.36.

•**The Detail**—The smaller craft is powered by a Continental 675 engine, with 550-hp take-off rating, driving two 35-foot diameter tandem rotors.

Long series of quality loading, 224 in. for the H-19 and 43 in. for the H-21, is cited as an important consideration for in-flight movement of passengers and cargo.

Comparable details on costs and performance are not yet available on the bigger H-16 transport copter, but the manufacturer points out that obviously the larger passenger capacity would lead to more lower passenger rate costs.

Operating speeds of the two smaller machines are quoted for the PD-22 at 130 mph, cruising speed at 60% Rated power at sea level with 15,000 lb. Normal gross weight, and 130 mph, maximum speed, for the PD-18, a maximum speed of 114 mph, with cruising speed of 100 mph. The larger craft will have a 14,000 lb. service ceiling with 1,700 hp maximum rate of climb with normal power, as compared to 10,670 ft. and 1,130 fpm for the PD-18.

Chips Are Down On Ocean Air Couch

International scheduled airlines that won't roll back down to decide as to how they will change for their first trans-oceanic route service. They meet at Nice, France, Nov. 27 to make this key decision.

Pin American already has two full-page ads in the newspaper to announce the opening of such service for a European market "at a price you can stand."

Observers, including British Overseas Airways Chairman Sir Miles Thomas, former president of a New York-London routing at \$477 to attract new customers, with comparison with full-fare of \$711.

•**Ask United Fares**—Pin American has estimated that \$477 may still be too high to tap the mass travel market, but Sir Miles Thomas, former president of a New York-London routing at \$477 to attract new customers, with comparison with full-fare of \$711.

Pin American has been determined to break the International Air Transport Association's rule to get the lowest fares. But CAB had PAA and TWA in some member of the group. The group has been determined to break the International Air Transport Association's rule to get the lowest fares. But CAB had PAA and TWA in some member of the group.

•**In Agreement**—Pin American has won a major battle in bringing down the major carrier to within only 6% of its basic price-dash accommodation. Even that, since, some international carriers were going to start at \$60 of 1952 and should be paid over \$500. Then, after the TWA election, BQAC came out for \$479 a round-trip CAB would on \$477. TWA, BQAC and Air France agreed.

Other questions before the Nice conference this week are:

•**When should each start?** Air France says July 1, Pan Am says April 1.

•**What should volume cost fare be?** CAB recommends \$197 as the "off" season compared with \$477 "on" season. Air France doesn't think it is ahead that rate.

•**Regular winter service January-March, 1953.** CAB takes no stand, but says it does not oppose TWA's plan for special 17-day airport service would end in winter at \$414.50.

•**Regular winter service throughout.** CAB says it can see no point in lower winter rates on regular European planes when the much shorter routes are available.

•**Sleeper plane class?** CAB opposes its

position that the minimum New York-London service for sleeper service should be 150 seats versus 175 for double berth. CAB says: "The Board programs that the configuration of the Boeing 377 permits the addition of longer accommodations without the sacrifice of passenger load." It says the advantages of the Boeing 377 are not offset by its high seat-mile operating cost.

As to other type planes, CAB says that there is no reason "there is a limit of approximately 16% of the seating capacity."

•**CAB says "technical success"** is deeper than on other routes also.

•**Stipulating change.** CAB also says an extra charge of \$14 for sleeper service.

•**Discriminatory rates?** CAB will vote any proposal that special rates be given to passengers of the airline's own as holiday, or any other type discrimination.

U.S. Jets Superior In Power, Economy

U.S. concentration on the development of anti-fuse type of jet engine while the British still were trying to use more power from centrifugal type definitely has paid off. The country shared at Bremen in the jet age, according to Frederick B. Reinhardt, chairman of the board of United Aircraft Corp.

At the end of the war, Britain was "ahead of the field in just jet engine knowledge," he explained. Reinhardt told a news conference in New York that that was with the centrifugal type of engine. In 1946, U.S. engine engineers had started exploration of the first configuration. Such engines were quickly put into production and service.

"Today," said Reinhardt, "the U.S. is as far ahead in the jet age as the British were in the 1930s. The U.S. and Britain, BQAC, UAC, Pratt & Whitney Aircraft division has developed the 10,000-hp thrust J-35, and other U.S. companies have engines coming along in the same power class. Only drawback is that the J-35 is "too heavy not quite as far along the road to full production as the Avon and Sapphire."

But the BQAC engine is far superior to the British engine in power and economy—it is 25 to 30% better in fuel consumption—and Reinhardt hopes his company will be able to overcome the production time lag in a short time.

As one indication of the J-35's fast economy, Reinhardt said it is the first engine that offers better fuel economy than the BQAC engine.

Reinhardt said that the J-35's fast economy is a result of its design.

1953 Procurement Set at \$10 Billion

Aircraft procurement is scheduled to get a \$10-billion slice of the approximately \$92 billion military budget which Congress will be asked to pass for fiscal 1953, a Washington source disclosed last week.

This does not include Mutual Defense Assistance Program arms and aircraft expenditures, which are expected to add another \$7 billion to \$8 billion to the \$32 billion, but for which there has been no aircraft procurement made available.

These figures of the 1953 aircraft budget will go to Air Force. The Army wants about \$100 million for helicopters and planes, and the balance will go to the Navy or Air.

•**More Later**—Overall total grade procurement for 1953 will be just below \$12 billion, down from \$12.5 billion over 57 months from 1952. Funds have already been allocated in advance. So far, the 1953 aircraft budget will be cut an additional 12 to 14% in the financing of already established programs.

So far, the long-brewed 143-avg Air Force has not shown up in the calculations for next year's military. Chairman said that the equipment money for this step will be included in a supplemental request sent to Congress some time after the original budget is submitted and the scene is well known.

Despite the reduced appropriations request in the main 1953 budget, the build-up in military spending will continue next year. That year the Defense Department is expected to spend about \$14 billion, and next year, the figure is expected to be moved even higher-up to \$15 billion.

•**Peak in 1953**—But contract letting will slow down during the balance of 1952 and will drop off appreciably during fiscal 1953. Defense procurement spokesmen say that contracts for work that cannot be performed by some time are already piling up at defense plants.

Butler said that future competition of contracts in wholesale lots, as was done during World War II, is the slowdown in being put into effect now, they say.

Settling in fiscal 1953, the contract letting curve will come the spending curve.

Running an almost war pace, section manufacturers may expect the peak of contract letting by spring of 1953, according to a study issued last week by the War Relocation Authority, which is in the process of looking for new work.



MAMMOTH PRINCESS ROLLED OUT

one of the most often wings with retractable airfoil attached, ready for installation. The Princess jet looks like a 3,500-lb. Bigfoot turboprop transport. When complete, the flying boat will weigh about 140 tons and will carry more than 100 passengers.

It is a winged speed of 300 mph. Note the configuration of the anti-dive hull, which will be constructed. The cone has been used to permit the pilot to show the tip of the hump to the plane was rolled out. Three Princesses are being built.

Seen at FSF's Bermuda Safety Seminar



E. S. CALVERT, Royal Aircraft Establishment, received FSF plaque for developing center line and last approach lighting.



E. A. CITTERMA, American Airlines, was honored for sponsoring adoption of center line system over other types.



KIPIN GILL, Eastern Air Lines, was given FSF award for work on expensive lighting undercarriage lights.

Last lighting was the Number One topic at Flight Safety Foundation's safety seminar at Bermuda Nov. 14-15, attended by top airline, industry, government and military engineers and executives from the United States, England and Canada.

► **Safety Awards**—A highlight of the conference was presentation of the FSF's safety awards directed by Aviation Week to E. S. Calvert, E. A. Citterma, John Giff and Dr. Ross Green, pictured on this page.

The sessions included talks, films and demonstrations of new procedures, control and methods of lighting, blame, and various scene techniques.

Also discussed were cockpit information presentation, passenger status, lightning, approach and landing problems, language, crash survival, smoke and safety, use of CW Doppler radar in preventing collisions, controlled entering, instrument failure, and mid-air collisions under VFR conditions.



OTTO KIRCHNER, SA operational engineering director, and RICHARD NOACK, LSC president, exchange scene comments.



JERRY LEDERER, FSF director, with Walter Bureau's DR. RUSS GUNN, honored presentation slide research.

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● We shall be glad to assign a staff engineer to work with you in solving problems in plastics connected with new developments in the industry.

SWEDLOW—another 1959 12th Specialty—is a rapidly expanding company, as fast as building and design firms, in the leading aircraft manufacturing areas of the U.S. and Canada.

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What We Have Learned From V-2 Firings

• Failures, successes give valuable information.

• Main lesson: simplicity is key to missile research.

The German V-2 rocket, pioneer of a new sort of warfare, has been arriving the United States as a research vehicle during the last few years. And those firings have shown that failure can furnish as much useful data to researchers.

- The *Luzerna*—A study of the 68 test firings indicates there were basic engineering truths.
- Simplicity equals reliability.
- Reliability of the whole is less than that of any part.
- There is no single fundamental principle that applies.

A majority of positive and negative results of the V-2 test firings was given by Dr. Richard W. Porter at the recent meeting of the New York section of the American Rocket Society. Dr. Porter directs Project Hermes, a joint General Electric-U.S. Army Ordnance guided missile project.

He said that 45 rockets performed "successfully"—that is, they accomplished the test purposes for which they were intended. Two or two of these 45 rockets showed absolutely no malfunction of the rocket. The remaining 13 provided useful test data although rocket performance was inferior. In addition there were 23 unsuccessful firings.

In spite of the size of the rockets, and the fact that firing crews had to accommodate expenses as they went along, the overall performance of the big missiles was better than accuracy obtained by the Germans in field firings, and the ratio of good to bad results set by U.S. crews was above that predicted by some scientists who were interrogated at the start of the program.

• *Theoretical Sidekick*—The whole story of how the V-2 rockets got to the United States is a wild adventure. Technical intelligence issues (which included Dr. Porter and several other GE personnel who were the nucleus of Project Hermes) ranged through Germany on the hunt at the American army.

They first made direct contact with scientists working on the V-2 program



SUCCESSFUL firings of V-2 rocket in well to follow give scientists important data.

at Daimlerstadt, site of one of the great secret astronomical schools in Germany. At General's Headquarters they found the scientific staff of the German rocket experimenters test stations at Peenemünde, which had moved north into the Baltic. After which the Russians moved across the top of Germany.

• *Underground Lane*—At Northampton and Blois, France, (now in the Russian occupation zone) the team found the great underground production lines which turned out the V-2 in quantity. The rockets sent to the United States were gathered in this area by crews working without parts lists. They pulled everything they could lay hands on which looked like part of a rocket.

Added to the problems of collecting rockets were those of collecting documents and personnel. Calendars of reports, notes, correspondence and plans were found and executed. The families of the scientists were rounded up on

short notice and moved out with what they could carry on their heels.

So the technical teams had to find scientists and rockets and documents, organic concepts and forms, transport household goods and children and wives and mothers.

And this all had to be done against a tight time schedule and in the face of a Russian advance across the zone.

It was done, and parts and equipment for about 300 rockets were collected and shipped to the United States.

• *Firing Program*—The first round fired at White Sands was a check run of the rocket motor. On May 15, 1946, the New Mexico desert reverberated to the thunderous roar of the V-2's 58,000-hp thrust motor. The huge rocket was fired on a static test stand set into the side of a mountain, with a concrete thrust pit below to receive the jet blast of the motor.

About two months later, on Aug. 16,

A million lire per hour? That's the real cost of the six Janitrol heaters aboard this brilliant new airplane. "Confederation" of the rules is provided by two Janitrol 5-400 heaters from which warm air is directed to individual outlets for the passengers. The same heaters also warm the cockpit and provide wonderful heat long in addition, four 5-200 heaters are installed in the engine nacelles for wing, vertical stabilizer, and tail section de-icing. All four of these

heaters are controlled by ducts to a common plenum located beneath the cabin compartment floor where heat is directed to the wing and tail surfaces. Engines and TBO, like most engines, have had long experience with Janitrol combustion heaters which led them to specify "Janitrol" with full confidence in their dependability, performance, and economy. Check your Janitrol representative on any problem concerning heat—wherever you want it.

NEW STORY

Eastern and TWA specify Janitrol heat in the Martin 4-0-4

OLD TWIST

Janitrol now standard equipment in the 4-0-4, as on scores of leading commercial and military aircraft.



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P. H. Bell, New York, N. Y., 222 Broadway; C. E. Jackson, Kansas City, Mo., 1291 Grand Ave.; Lee Davis, Indianapolis, Ind., 3844 Colburn Blvd.; B. B. Gault, Washington, D. C., 4601 East West Highway; Rock-Isle, Pittsfield, Ill., 510 East 10th; Engineering Development & Production, Detroit, D. Bays, Toledo, O.

ing two faults require an explanation of the V-2 firing procedure.

The lines which carry liquid oxygen and alcohol from tanks to combustion chamber contain valves which are known as main oxygen valve and main alcohol valve. Each valve has two preliminary (partial flow) and main (full flow). In starting the rocket motor, the valves are opened by remote control to the preliminary position and gaseous flow begins gradually to the motor. When the operator is satisfied that the fire is going, he pushes the button which opens the valves for main stage. For some reason, the alcohol valve closed during preliminary stage instead of opening to full.

• **Inadvertent closing of alcohol main valve (acc).** Again for reasons unknown, the main valve in the alcohol line closed and opened several times during the firing.

• **Premature closing of oxygen main valve (acc).** Cause unknown.

• **Alcohol leaks (loss).** Any leaks in the alcohol system tend to flood the tail compartment of the rocket with explosive vapor. Either a fire or explosion results, with resultant damage to the propulsion unit and loss of the rocket.

• **Subnormal oxygen flow (acc).** The rocket must burn for a certain minimum subnormal even after careful analysis. In great loss because one of the most startling sights in rocket history.

After the motor fired in preliminary stage, the operator was satisfied with the appearance of the flame and gave the signal for main stage. The main stage flame looked correct, but the rocket did not rise out of the stand. The operator then pushed the ground control button, but nothing happened. Shortly after, the rocket had lost enough weight to take off. During the next five seconds, it rose magnificently to a height of only 12 ft. The rocket continued until it ran out of fuel, but with greatly reduced performance.

• **Steering System Failures—Faults in steering system components accounted for 16 bad counts. In addition, experimental guidance systems caused four failures. That is the way they broke down into counts.**

• **Broken jet vane (acc).** There are four jet vanes mounted at the base of the rocket. These vanes are partially submerged in the column of fluid from the motor, and serve the rocket by steering the fluid around. Because of the temperature encountered, the vanes are made of pure graphite, which is very brittle. Apparently a vane had been cracked during manufacturing, and broke, with consequent loss of steering ability. Quality control eliminated later troubles on this count.

• **Vanes hard over (acc).** One of the jet vanes received a false signal which caused it to go to full deflection and

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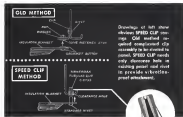


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stay there, with the resultant loss of the reward.

- * **Gyro or amplifier (lever)** This second lever became of a failure to understand the amplifier (which translates earth signals received from the gyro into signals sent to the vessel or to the gyro).
- * **Loss of electrical power (fuse)** Run into one fuse.
- * **Loss of control (fuse)** This may refer to a useful electrical fuse.
- * **Vane to center (tor)** The exact cause for this nonsense sentence has it could possibly have been a power loss. Whatever the cause, a jet was coming from the vessel and the rocket was being fired.
- * **Vane balance control pickup (tor)** A pickup is the term given to a signal from a sensor, such as a pressure sensor of a village within the vessel. Balance controls are used to balance the arm post of each pair of vane so that the resulting steering force is uniform to the vessel. The pickup is still upset the balance, and the pickup the line of the rocket is triggered loss.

- **White input circuit pickup (one):** This circuit carries the pickup signal data from pins to amplifier. A pickup is thus connected to the circuit, and the pickup is lost.
- **Radio control input circuit pickup (two):** Control radio control apparatus was not used during the flight at White Sands, but the apparatus was never removed from the rocket. It malfunctioned and two sounds were lost.

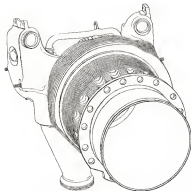
• **Contained sections of the gym (three).** Before taking off, torque wrenches met the two steering gyms, one to a true vertical and the other to a true horizontal. At those positions, the wrench cut out. But for three of the V-2 records, the wrench did not cut out, and instead continued to align the gym with track. This control of space was. When this happened, the rocket went into a tight turn from which they did not recover.

- Experimental guidance systems (Ivan): There was no further elaboration on those cases of failure, because of security.

There was also one category which did not fit into any category above:

Explosives are used to blow off the railroad after the VI has started the descent. This is done to make the rocket unstable, which slows it during its drop to the ground, making recovery of instrumentation somewhat easier. Is not sound, and for no known reason, these explosives blew while the rocket was enroute to take off.

► **Errors**—It is possible to make a further breakdown of these common errors which caused aborted sounds. Electrical trouble—(Continued on p. 35)



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The principal use of Nimonic "75" has been for nozzle guide vanes, flame tubes and other combustion chamber components in most British aircraft turbines. It is most often used where inlet temperatures exceed 1450°F. Nimonic "75" renders good service under these conditions for the following reasons:

1. High creep and fatigue strength.
2. High oxidation resistance at elevated temperatures.
3. A low coefficient of expansion (similar to mild steel). (Keeps distortion to a relatively low level.)

MACHINING: Nimonic "75" has been machined by most common methods, and with standard equipment. Its toughness and capacity for work-hardening, however, necessitate sharp tools, slow cutting speeds and an ample flow of lubricant.

WELDING: Nimonic "75" is readily welded by any of the following methods: oxy-acetylene, inert gas arc, metallic arc, carbon-arc, atomic hydrogen, flash, spot, stitch, seam and butt welding.

FORMS PRODUCED: Nimonic "75" is produced in sheet, tubing, rods and bars.

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NIMONIC "80" A

Nimonic "80" A is the standard material used for moving blades in every production aircraft turbine in Great Britain.

While the superior creep resistance of Nimonic "80" A is largely responsible for its suitability in this service, the following factors are no less important:

1. High oxidation resistance at elevated temperatures.
2. High fatigue strength under stress.

Nimonic "80" A is essentially a forging alloy, and as such compares favorably with other alloys designed for prolonged high temperature service under stress.

MACHINING and **joining:** The same methods of machining and joining used for Nimonic "75" can also be used for Nimonic "80" A.

FORMS PRODUCED: Rods, bars, forgings.

For help on specific metal problems write directly to Inco's Technical Service Section, at the address given below.

Approximate Composition

	NIMONIC "75"	NIMONIC "80" A
Carbon	0.05 — 0.12%	0.10 max.
Manganese	0.50 max.	0.50 max.
Sulfur	0.015% max.	0.015 max.
Silicon	0.50 max.	1.00 max.
Chromium	18.00 — 20.00	18.00 — 20.00
Nickel	5.00 — 6.00	5.00 — 6.75
Iron	80.00 max.	80.00 max.
Copper	0.20 max.	0.20 max.
Aluminum	0.40 max.	0.75 — 1.00
Tin	Trace	Trace



*Reproduced by The International Nickel Co., Inc., with the permission of Pratt & Whitney

The turbine blades in the J-42 Turbo-Wasps are made of Nimonic "80" A. And in two years of active flying duty these jets have flown more than 150,000 hours *without a single turbine blade failure!*

For more information on high-temperature Nimonics, read the opposite page.



Lockheed P2V Neptune
power packages built by

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(Continued from page 30)
ble accounted for 27 poor results, the remaining ones were due to mechanical troubles.

If the bad results are aggregated under general names, then the list looks like this:

- Random errors (one). Detonation of explosives caused this.
- Design or workmanship, including wiring (22).
- Inexperience, lack of test (eight). An example of this would be the failure caused by the breaking of a jet wire.
- Personnel error (one). This refers to the inadequate testing of circuits.
- Special experiments (four). These were the experimental guidance system.

Another way of looking at the failures shows that 25 occurred in flight and ten at takeoff or before.

What Was Learned—After reviewing the causes of accidents, Dr. Potter presented his idea of compensable figures for a V-2 or equivalent program which could be started now. With the experience gained during the past five years, Potter felt that the 22 design or workmanship accidents would be reduced to a matter of two or three, and that in experience or lack of proper tests would not be a factor.

He still allowed for one personnel failing, and one random occurrence. Thus the total of failures which could reasonably be expected would be about four to five—BAAA.

Research Contracts Increase at NYU

Nearly \$2 million of new and renewed research contracts are currently in force at New York University's Engineering Research Division, according to a recent announcement by Dean Theodore Saville.

This contract dollar volume is about double that of last year. Some of the increase is attributable to military research demands, but much of it is the result of planned expansion.

Of particular interest is the aviation field in NYU's research on these subjects:

- Avionics. Engineers here has been on instrument techniques and system research, with additional research on avionics systems, network theory and computers.
- Rocket fuels. Navy's Bureau of Aeronautics and Office of Naval Research jointly sponsor an investigation of the possibilities of different synthetic compounds for use as rocket fuels.
- Windtunnels. Metallurgical research on this new metal is being attempted in fields of high purity melting and electrolytic polishing. Alloy is being studied, as are machining methods.



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HIGHER RESISTANCE to erosion, oxidation and abrasion at the rocket on new Series 600 chrome carbide cylinder heads (top) as compared with older tungsten carbide heads. They are shown here after 6000 hrs test.

New Carbides Fight Heat, Oxidation

Two recent carbide developments by Carbidey are expected to have important applications in aircraft manufacturing.

• **Series 600 chrome carbide** test considerably lighter in weight than conventional carbides, and have shown good resistance to high temperature oxidation.

• **Tungsten carbide bearings** are showing excellent properties in laboratory tests at high speed, high load and high temperature operating conditions.

Carbidey cites three test results in proof of the valuable properties of its Series 600 chrome carbide:

• **Temperature tests.** Samples of the metal were exposed for 24 hours at 1850° in air, and retained their metallic luster, with virtually no dimensional or weight change. Conventional carbides and stainless steels, meanwhile, were reported to have disintegrated completely at these temperature ranges.

• **Shock spray tests.** At Bendix Memorial Institute, Series 600 carbide were subjected to a 30% air-gas jet for 750 hours and were so mildly affected they required their metallic luster. With all plastic acid as a corrosive agent, they showed about 30 times the resistance of 18-8 stainless steel and triple the resistance of conventional carbides, reported Carbidey. With more acid, resistance was reported about eight times that of other carbides.

The chrome carbide appears to be nonmagnetic. Their erosion resistance is about the same as steel. They are nonoxidizable to about the same extent as tungsten carbide. The Series 600 metal, incidentally, are much less dense than other carbides—tungsten carbide, twice by weight is about the same for the two others, but you get nearly twice the volume of the lighter chrome carbide per dollar than you get with tungsten carbide.

The chrome carbide welding, cer-

am out by General Electric's Carbidey department at the Metallurgical Engineering Co. in only one of a number of other developments told publicly for the first time. A related way was that of aluminum carbide, sintered at ultra-high temperatures operating conditions—a development still in laboratory stage.

Of course application as Carbidey's new "thermoalloy"—temperature-sensitive reaction. Their electrical resistance sharply decreases with rise in temperature. Applications are indicated as the sensitive elements in flow meters, liquid level indicators and controls, voltage regulators, vacuum gauges, switching devices, etc. Temperature coated in fire as 1/1000th of a degree is claimed.



8,000-lb. Load No Bother to Him

Decelerating at 45Gs didn't particularly bother Major John Paul Stapp—and that's the same as loading 8,000 lb. on him. He didn't blink or say a word as he rode on the rocket-propelled sled at Edwards AFB, Calif., but did he lose the ability to know his limits, or to see or hear?

Major Stapp, who is an area medical consultant at the Wright Air Development Center of Air Research and Development Command, recently has done a series of deceleration tests with himself as the subject.

In the extreme of pilot safety, Major Stapp rode the rocket sled to check his man resistance to extremely high, short-duration decelerations, and to prove the stability of a new restraining harness for pilots.

Last week he was presented the Air Force award of the National Research Council for his work.

The rocket sled runs on a 2,000-ft track and is propelled by three 1,000-

hp thrust rockets. Within 500 ft, the sled reaches a speed of 170 mph. It then coasts to 154 mph, and a braked deceleration rate of 31 G, and about one-fifth of a second.

This is a deceleration rate of 45G per sec, and is comparable to slowing an airplane from 120 mph to a dead stop in 19 ft.

The new harness tested by Maj Stapp is a modification of the current AF type.

Two shoulder straps rest on the handle of a lap strap and an inverted V-shaped leg strap. Design of the harness distributes pressure evenly over the solid structure of the shoulder and hips, which are the body parts best adapted to load carrying.

Northrop Aircraft, Inc. designed and built the deceleration sled equipment to Armament Lab open. Northrop personnel operated and maintained the equipment on strict contract with the AF.

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MICRO SWITCH offers the only hermetically sealed toggle switch for aircraft

This new MICRO precision switch is designed especially for aircraft applications that involve change in atmospheric pressure, change in temperature, corrosive atmosphere, dust, dirt, oil or water. Its hermetically sealed, vapor-proof character prevents formation of condensation on the switch contacts. Electrical capacity is unaffected by change in altitude.

This MICRO sealed toggle switch meets a 100 hour salt spray test under QQ-M-151a and vibration specification similar to that in MIL-S-6755. Mechanical life tests indicate much longer life than usually found in a hand-operated switch. It is mounted in a "U" bracket housing with 15/32 (3) panel mount backing. The positions are maintained "OFF" and "ON."

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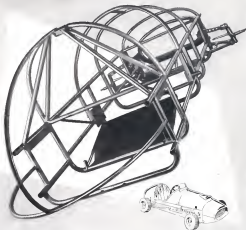
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Write Harter Corporation or phone Sturgis 381 for complete information on Harter's metal forming and fabrication facilities. Harter Corporation, 871 First Street, Sturgis, Michigan.

PRODUCTION



CHRYSLER showed components it is building for C-124A and . . .



GRUMMAN SA-16 amphibian, but Navy changed priority on . . .



AFTERBURNER of J-61s company will make. Also shown was . . .



HEAVY STANDARD prop which Chrysler built under license.

What Chrysler Is Doing for Air Power

Production of jet engines, props, major components of C-124A and SA-16 keep company plants booming.

By Alexander McDermott

Detroit-Chrysler Corp. is about to take on an even bigger share of automotive business than the submersible contracts it already holds; it was declared here as the big automobile company unveiled exhibits of its major defense programs, along with an elaborate showing of its sleek new 7552 car.

Chrysler's four main secret projects, so far disclosed are: • Complete licensed production and testing of the Pratt & Whitney J-68

jet engine of 6,250-hp thrust (5,700-hp thrust with afterburner) probably the most powerful U.S. jet engine now in use. • Station assemblies of the Douglas C-124A Globemaster which together make virtually all of the Air Force's biggest reserve transport except the plane's cabin and nose section, and the center portion of the wing, starting from the outboard engine nacelles. • The complete 50-ft hull of the Grumman SA-16 scout amphibian. • The 16-ft. diameter four blade

Hawthorn. Standard-kiaed propeller designed for use with R-4500 engines on the Boeing C-97 Stratofreighter. Considering the present popularity of the new four Chrysler engine projects and additional contracts in Argentina, however, it appears the company may end up building both airframes completely on its own plants under license, relying there with ready for trucking to export and flyover.

► **Pelvic Contracts**—The Gloster-Grumman-Chrysler already described as an engine-driven aircraft, appear potentially the biggest single piece of military defense work for the company.

The G-124, while a very large plane, is not a complicated aircraft from stand point of valves or features of aerodynamic requirements and, like the other USAF cargo planes assigned to Korea, France, production, the Fairchild C-119 and the Chase G-123, appear well-suited for automotive mass production methods.

USAF placed third year 1951 contracts for approximately 150 of the planes with Douglas and even larger future contracts are anticipated, as the need for such of heavy military equipment grows with the expanding U.S. military activities in Europe and Korea.

Phyrenth division of Chrysler already has received letters of intent to produce the other wing panels and wing ribs, ailerons, flaps, and complete tail of the airplane.

The division expects to get additional orders to build forward and aft fuselage, nacelles, now under negotiation, leaving only the nose section and wing wings for Douglas.

► **Mass Spacing**—The assemblies will be produced in the Los Angeles (Phyrenth) plant where 800,000 sq ft of new space is being added to automotive assembly area, which will be converted for this aircraft work.

At the Chrysler shop, a long close metal panel depicted the G-124, with flying lights denoting the various assemblies which Phyrenth will make. Complete change-over at Plymouth Los Angeles for the G-124 is expected in January, 1953.

The big plane has a 175,000-lb. gross weight, and is designed to carry 50,000 lb. payload for 1,500 miles. It is designed to carry 14,000 of all military vehicles fully assembled, and has 18,000 sq ft of cargo space available. Current proposals on line Pratt & Whitney R-4460s, but a new experimental XE-124B will be powered with Pratt & Whitney T-14 turboprops, with considerable greater power, and consequent increase in payload.

► **Security**—Involving, although on microscopic accuracy at the Chrysler shop was the engine photo slide cover which showed the silhouette of the J-45 engine on display and a large sign in red letters nearby which and "classified."

This was in spite of the fact that an official Navy spokesman said show on the J-45 at East Hartford, Conn., had released many details on the engine and afterburner and photographs of both only in 1950.

These details and photographs were published in Aviation Week, May 6, 1950 p. 15, and in many other magazines, newspaper and aviation year books.

A Chrysler spokesman and Navy had placed a restriction on showing the afterburner.

De Soto division of Chrysler has contracted to build the afterburner, while Dodge division will build the engine, in a large new 3.6-million sq ft plant now in early stage of construction, at Mt. Clemens, Mich., and scheduled to open production early in 1953. The initial J-45 contract has been estimated tentatively at around \$140 million with additional contracts to follow.

► **Long Trackback**—Now everything around about the second Phyrenth engine projects—building the 34-16 airplane built for Germany at the Plymouth Knoxville, Ind., plant—except a long trackback from Enza-

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wife to the Grumman plant at Beth page, L. I. Here the wing and powerplants are fitted, engine fittings are taken care of, and the plane is flight-tested.

The hull is put on a 70-ft trailer for the overland journey and has to go as previously 400 miles off the most direct route to Bethpage, a Plymouth representative said, in order to get the necessary highway overhead clearance and to comply with bridge loading requirements.

A severe procedure of shipping the wing and powerplants to Danville, at which Plymouth build the complete airframe and shipping just the powerplants, would be more economical.

The plant where the hulls are built is not at an airport, but the large sea Easwille airport, where Republic P-47s were flight tested in World War II, is not far away, and the nearby Ohio River would be available to the time for water hull tests.

Plymouth Danville probably will make about 12 of the ocean plane hulls a month when it reaches full capacity.

Prop Contract—The Hercules brand popular for contract sale for the plane to be built at Dodge's San Francisco, Calif., plant near San Francisco.

Not strictly an aircraft display but certainly an aviation by-product was a huge Chrysler car red seen displayed at the show. The seven directly over 170 models, described as the latest mass ever attained in modern production and close to the absolute maximum of 100 models.

Admittedly, Chrysler is still at a very early stage in its aircraft and engine program. Of 100,000 total Chrysler employees, about 7,500 are engaged exclusively in the work.

Chrysler officials are estimating the company will need a total of about 7 million sq ft of floor space to build its complete program, but that requirement on was projects will increase slowly. By April 1, the company expects it will need 14 to 15,000 sq feet.

Solar Licenses Ceramic Coatings

An extensive line of Solarmax ceramic thermal protective coatings now will be made available to the aviation industry on a production basis as a result of a licensing agreement between Solar Aircraft Co., San Diego, and Evox Corp. of Cleveland.

Production already has been started by Evox, a large producer of raw materials and formers for the porcelain enameling industry. Evox will market Solarmax by grades, each engineered for specific temperature range.



TEST rig fits tail of engine into aircraft, completely prefight checks jets. And . . .



INSTALLATION is removal of engine is done in a matter of minutes without all hours

Jet Rig Cans Noise, Speeds Tests

New unit prefight-checks engines completely before they are installed in actual airframe.

Toddhard Aircraft engineers are cutting three days from production time for P-94 interceptors and F-101 fighters jets with a novel "test cell" fixture.

This new prefight-check station for jet engines replaces the former arrangement in which the Alaska powerplant was tested in finished airframes. This required moving the planes from the factory to an outdoor battery of Mustang aircraft.

During the test run also-mechanics would occasionally show up to request engine removal—a complete track lay and expensive job.

Now the engine test rig before the actual airframe is completed. The first leg is on an old jet plane stripped of wings, canopy, landing gear and tail assembly. It carries metal wheels and sits along a track so aimed that the

knockoff and end fits into mouth of the aircraft.

The powerplant can be installed in and removed from the knuckle in a matter of minutes. There are direct fuel and oil line connections to eliminate need for fuel trucks. In addition to turning production time, valuable space is saved by saving the weights rig instead of an actual plane.

New Flight Hangar

McDonnell Aircraft Corp. has broken ground for a 53.5 million light jet hangar near its plant at the Lambert-St. Louis Municipal Airport. The building is scheduled to be completed late next year. The company also plans to add passenger jet hangars, each capable test facilities and \$2 million worth of wind tunnels.

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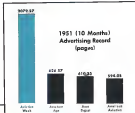


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Labor Force Must Double in '52

Shortages showing up in unskilled categories as well as skilled; engineer situation critical.

Despite the large increase in aircraft employment that already has taken place since Korea, the industry will have to recruit more than double its labor force by the end of next year if it is to meet planned production goals.

That is the forecast of Director Robert C. Gordon of the Bureau of Employment Security in a special report to unskilled and partial unskilled labor used in the U. S. Department of Labor.

During the last year after Korea, the number of aircraft workers rose from 256,000 to 447,600. By the end of 1952, Gordon estimates there are additional 660,000 will be needed. Not all of them will have to be recruited and hired by aircraft companies. Many will come from other lines of work in such fields as aircraft maintenance, repair, and parts manufacturing. Others will be trained in the industry itself.

What is needed is a September survey by BLS showed that most of the aircraft manpower shortages are in highly skilled technical workers needed in planning and designing. Later surveys disclosed shortages also beginning to show up in various production workers. Other shortages:

• **Engineers:** BLS found the "most persistent unmet demand" is aircraft in the categories of all types—mechanical, structural, electrical, electronic, industrial and others.

• **Technicians:** Hard to find also are workers with skills needed in getting ready for mass production—draftsmen, tool and die makers, designers, production planners, tool designers, solder and electronic technicians, airplane engine and stress analysts.

• **Mechanics:** Expansion in the industry is expected to intensify the short ages of aircraft technicians, aircraft engine mechanics and aircraft assembly mechanics.

Living standards are being raised in aircraft as a result of the inability to find enough qualified workers, BLS found. Age restrictions are being relaxed, experience and physical requirements are becoming less rigid.

Other steps being taken to alleviate the worker shortage include an increase in training hours of workers, lengthening of working hours and starting normal and third shifts.

• **The Labor Market:** Here is how the labor market looks up to next winter in aircraft production:

• **Shortage:** Welders, drafters, tool and die makers are in "short" in the aircraft industry.

• **Unskilled surplus:** In Los Angeles, Fort Worth and Pittsburgh, N. Y., there is a "moderate labor surplus."

• **Substantial surplus:** New York City is the only center in the category

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North American Aviation, Inc., Los Angeles, is adding new facilities priced at \$51,300 sq. ft. of manufacturing area. Two leased buildings at Comdore and El Segundo Rivers will be used for F-86 sub-assembly, two hangars on Sepulveda Blvd. will be used for F-86D modification and electronic installation, and three structures will be put up to handle manufacturing at Downey St.

save time... speed production on the Northrop F-89

Here's the U.S. Air Force's new Scorpion F-39 all-weather fighter now rolling off the production line at Northrop Aircraft, Inc., Hawthorne, California. Combining range, speed and punch with "X-ray eyes," the Scorpion is the jet-propelled successor to the famous World War II Black Widow.

Note the *jet-like* control surfaces at the outer end of the wing's trailing edge. These are Northrop's latest development—"Decolsons." Combining the functions of ailerons, fighter brakes and landing flaps, Decolsons pack extra maneuverability and weight-lifting ability into this razor-winged, transient fighter.

Note also that Northern uses Cherry River in the

fibresation of these Decalurns. Like many other aircraft manufacturers, Northrop Aircraft, Inc. has found Cherry River's make their hard jobs easy.

Cherry Bricks are installed by one man from one side of the work. They eliminate the two-man crew used to buck solid rivets. It's a pulling action that does the work—no twisting, no exploding, no hammering.

Cherry Rivers are ideal for double-surface structures, box sections, tubes, ducts and other "hard-to-get-at" spots. They spend assembly . . . out man hours . . . lower unit costs. If you're not familiar with Cherry Rivers and their time-saving potential, take a moment now to write for full information.



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software, including the use of a software X-Ray machine) to identify absolute structural integrity. Third, *Leishman*-harvesting systems like our CENTRI DICE method of harvesting, with developed to give savings in space, electricity and time, have been demonstrated and tested against some of the other types of harvesting systems. For example, today's harvesting units are subject to extremely high temperatures, depend upon *Leishman* CENTRI DICE technology. *Leishman* Centrifuges can be made to meet AISA, ASTM, AMS, ASME and Navy specifications.

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LEBANON Alloy and Steel **Castings**

Frontier's Pattern for Low-Cost Overhaul

- Package maintenance calls for specific jobs to be done on specific visits of plane to shop.
- And this 'close-to-the-chest' program will increase utilization of each unit by 48 days per year.

By George I. Christen

Denver—You don't need a large fleet of aircraft to make progressive overhaul pay.

The same sort of view that is cutting costs and promoting maintenance efficiency for Pan American World Airways at its maintenance base, Overhaul Base (Aviation Week Mar. 12), is also proving its value to Frontier Airlines.

Frontier maintains a fleet of 12 DC-3s at its Stapleton Field base here, while PanAm operates 117 Stratliners, Constables, DC-6s, DC-4s, Constables, C-46s and DC-3s at Miami for itself and Panagra.

Frontier figures—Frontier established its system of progressive maintenance in March, with a program geared to its own particular requirements.

Anticipated gains, aside from the leveling of work load and redistribution of parts procurement, include a reduction of 600 hours per airplane in maintenance time. Also, Frontier finds that by scheduling all its work to begin on Mondays and be finished before the end of the week, no aircraft will be laid out in the hangar on its work-week, which is usually occurring during the last day of the year.

The carrier estimates that this gives it an increased availability per plane of 48 days a year.

• **Package Deal**—Jack Bennett, Frontier's director of engineering and maintenance, wrapped up his progressive overhaul plan in a neat synopsis package. Each pattern represents one-half of the major maintenance work required to keep the plane in top shape, and should take three days.

Here is how Frontier works out its package deal.

First step is to make sure that inspection until each plane comes into the hangar at the next date desired. Level-off date, when the pattern of air craft visits becomes constant, is Mar. 1, 1957.

After that date, DC-3 No. 955 will come into the hangar on Monday, Mar. 17 for three days, during which time approximately 600 man-hours of work

will be accomplished performing a Number 6 pattern.

Frontier's recently completed overhaul manual tells precisely the work to be done at each pattern. And a discussion. In part of the plan, a "winging chart," shows in color code just when the work will be accomplished on the ship's landing, engine, wing, etc. Color code indicates whether the work to be done is major, aircraft overhaul, hydraulic, electrical, cabin or engine.

After this winging chart, is a listing of jobs to be performed at each being assigned a work order number. This is followed by a series of work sheets for each mechanic to sign off his work on. Three days later, No. 955 pulls out of the shop and goes back to work.

But, if subsequent overhauls are, two more working days means to show this up.

• **Next Plane**—On Mar. 31, this No. 955 plane is like a four-day interval—No. 1 pattern. Two weeks later, No. 970 is brought for a No. 2 pattern. So, if Frontier's present pattern is on schedule, the entire fleet of DC-3s will schedule through the hangar at two-week intervals. A complete 1,000-hour cycle will take 144 weeks, or 21 years, at the aircraft's estimated utilization figure. The plan as now laid out extends through 1959.

• **Series of eight** at various patterns.

- **No. One Pattern**—Accessory shop first time; Power brake cable, needle plumbing, and hydraulic of emergency valve change.

Electrical shop functions: Gasoline lower and pilot's compartment door change.

Radio shop functions: None.

• **No. Three Pattern**—Accessory shop functions: Landing gear upper truss; strut adjust and wing flap bar; gear or compressor cylinders and landing gear latch.

Electrical shop functions: Work on instrument panel to new terminal strip and pilot's instrument panel check, master and plumbing.

Radio shop functions: Overhaul all radio equipment.

• **No. Six Pattern**—Accessory shop first time; Main gear shock; and main strut, and wheel shock strut.

Electrical shop functions: Junction box to new.

Radio shop functions: All in cockpit forward compartment and belly of air plane.

The six patterns are scheduled so that each time an aircraft is overhauled within its specified period. The cabin interior is completed, "in condition" and is worked on during each pattern as required.

• **Kit** are prepared for each operation before an airplane enters in the dock, so parts and components can be as hand for the work to be done.

• **24-Week Interval**—Under the schedule, one new plane arrives in the hangar for one of its six progressive overhaul patterns every 24 weeks.

• **Extreme inspection** are performed. Thus, No. 1, No. 2, No. 3, No. 4, No. 5, No. 6, No. 7, No. 8, No. 9, No. 10, No. 11, No. 12, No. 13, No. 14, No. 15, No. 16, No. 17, No. 18, No. 19, No. 20, No. 21, No. 22, No. 23, No. 24, No. 25, No. 26, No. 27, No. 28, No. 29, No. 30, No. 31, No. 32, No. 33, No. 34, No. 35, No. 36, No. 37, No. 38, No. 39, No. 40, No. 41, No. 42, No. 43, No. 44, No. 45, No. 46, No. 47, No. 48, No. 49, No. 50, No. 51, No. 52, No. 53, No. 54, No. 55, No. 56, No. 57, No. 58, No. 59, No. 60, No. 61, No. 62, No. 63, No. 64, No. 65, No. 66, No. 67, No. 68, No. 69, No. 70, No. 71, No. 72, No. 73, No. 74, No. 75, No. 76, No. 77, No. 78, No. 79, No. 80, No. 81, No. 82, No. 83, No. 84, No. 85, No. 86, No. 87, No. 88, No. 89, No. 90, No. 91, No. 92, No. 93, No. 94, No. 95, No. 96, No. 97, No. 98, No. 99, No. 100, No. 101, No. 102, No. 103, No. 104, No. 105, No. 106, No. 107, No. 108, No. 109, No. 110, No. 111, No. 112, No. 113, No. 114, No. 115, No. 116, No. 117, No. 118, No. 119, No. 120, No. 121, No. 122, No. 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upon request. The passenger pays for the service, average charge is \$8 cents. Wilson said that one advantage of the Foster configuration was that it had a minimum of weight and balance problems.

► In the Shop—A tour of Foster's shops at Stapleton Field here showed several ingenious pieces of home-made equipment.

► Engine accessory checks. This device is used to check engine accessories after they are mounted on a built up engine, but prior to installing the engine on the aircraft. Thus, if a component is defective, it can be removed while still easily accessible, instead of after engine installation when the accessory action is concealed.

Accessories checked by the tester are: fan wearing thermocouples for polarity, continuity and speed, cylinder head thermocouples and wiring, generator field resistance and continuity, oil and carburetor temperature bulbs and wiring, starter vibrator and magnets continuity, starter cranking circuit, battery capacity generator for polarity and continuity.

► Harness mechanical machine. This device, which holds spacers in position during overhaul, saves a technician time working he had lost because Foster's type it saves many mishaps.

► Oil cooler shaker. This is simply an adaptation of a paint conditioner, such as used in any hardware store. Cooler is clamped into place, protected by felt strips. It is then washed out with acetone, soap, steam, and finally with Tropic Products Solgar. Foster's claims excellent results with this set up.

► Engine Run-In—Wilson, a former Colorado flyer, and pilot at World War II noted for the aircraft, pointed with pride to rugged territory over which his planes fly only.

Actually you can say the shops lie through just at the route, since they navigate through passes, such as 5,300-ft. La Veta in southern Colorado, with 14,850-ft. peaks towering on either side. Foster's pilots do it with the greatest regularity, and in instrument weather too.

And, like Progress, its local service engine neighbor to the north, Foster's operation is rough on its equipment because of the short distances between stations. This is where its "close-to-the-shed" type of maintenance pays off.

AA Soars World For Spare Parts

Tulsa, Okla.—The spare parts chain is a plugging American Airlines Marvin Whitlock, assistant vice president—maintenance & supply, told Airman Ware that AA will run out of Pratt & Whitney R-2800 crank



Supreme brand chucks are comparatively new in the field (2 years) but are made by experienced manufacturers of precision assemblies. They have proved their top quality performance under actual working conditions. Each chuck is factory checked for accuracy, assuring that every chuck that reaches the trade is dependable. Many

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Republic, Boeing, and other leading aircraft manufacturers are using many types of Aerotec Automatic Controls in increasing numbers. These controls are custom designed and built to meet specific problems of high speed and high altitude flight in today's aircraft. Each Aerotec automatic device passes rigid tests duplicating actual flight conditions to assure effectiveness and reliability.

The planes shown above are typical designs that incorporate Aerotec Autotrim Controls. The Republic F-44J Thunderjet, a combat-proven craft, uses Aerotec pressure switches and a new dual float switch suitable for tip or piston mounted auxiliary fuel tanks. Boeing has long used Aerotec valves, float switches, and pressure switches on their bomber planes.

When you are faced with problems of maintenance controls for flaps, landing gear and other heavier applications, fail transfer, flow indication, etc., consult Aerotec. One of our instrumentation specialists is now you, ready to give prompt and able assistance at any time. Call or write.

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shaft this month and will not get any more until March of next year.

In an effort to find crack shots, the office has sent representatives as far afield as Farn and Bombay searching for snipers.

The part costs \$2,700, and since it can only be used for two engine runs, the operating cost figures out to about \$1.35 an hour.

Connie Conversions

Kansas City—All 34 of Trans World Airlines' Conquestline Model 790s and ten 1054s now on order will feature forward compartments that can be quickly converted from sleeper compartment to passenger accommodations at vice versa. Conservative estimates in conversion will take 20 man-hours and eight hours slipped time, say TWA officials. They add that Lockheed has performed the conversion in three hours.

Purpose is to make slaps interchangeable for overseas (with savings tax) or domestic (with prorrata) use.



Better Plane Switch

Thermal switches for aircraft, reportedly more accurate and sensitive and providing more operation when subjected to shock or vibration than previous designs, have been developed by the Wilcoxon Co.

Higher performance is accredited to use of a new scap-acting, bivalent element, representing a "base ad-

placement is thermal blade design," says Wilkshire. The switches have various system applications, feeding out to fire warning systems (Douglas Aircraft Co.), de-ice heater systems (Consolidated/Vallrec), and with other equip-

They are supplied both with normally closed or normally open contacts, with less than two or

Most positive operation under shock conditions is achieved by designing switches so contact pressure actually increases up to instant the blade snaps and opens the circuit, the line ruptures. With normally open switches, the circuit defects from the positive

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until it snaps to close. Higher sensitivity is offered, the first side, because the internal element is in direct contact with ambient temperature (wide open construction of switch). The unit is noted at one amp, 250 v. ac.

The Wilshire Co., 8801 Newark Ave., Elizabeth, N. J.

Modification Boosts Convair 240 Payload

Tulsa, Okla.—American Airlines is well along on its Convair 240 modification program. Of a total of 79 planes, 45 have been modified.

The modified aircraft increases gross takeoff weight capacity from 40,000 to 41,200 lb., while the landing weight is boosted from 36,000 to 39,500 lb. Some 230 lb. are absorbed in the modifications.

Principal elements of the change is replacing nose gear strut with a new Bendix unit (the Convair let installed a Mission nose strut, but AA elected to use the new Bendix component instead and drag link. Extensive wing leading inboard of the aileron, plus ribstiff and stronger reinforcement to the center fuselage.

Among benefits derived from the modification is the plane's ability to

carry greater loads on short hauls where the small amount of fuel contained does not leave the ship's weight down to the old 36,000 lb.

Other major Convair projects in progress or contemplated are con-

version from high to low taxi-out sprogs, conversion to Hamilton Standard propellers and changing the fuselage about stack configuration to streamline for better engine cooling characteristics.



AMERICAN'S ENGINE HAULER

American Airlines has tested the Lorain Loader is also a good engine hoist. Less here at the airline's Tulsa overhaul base, the

unit is used to haul engines, mounted on stands, from engine shops to test cells and back, on a roller job at the base.

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A new filler cap for pressurized fuel and oil tanks in aircraft has been announced by Ross & Associates, Inc., designers and distributors of the device.

The cap, manufactured by the engineering firm of Leggett, Jersey City, N. J., is built to hold pressure from zero to 350 psi. No tools are required to remove or replace it. A warning flag on the unit can be seen for some distance when it is not locked in place.

The cap is designed to meet Air Force Specification No. 285574, Types I and II, Ser. 5. The mounting flange is interchangeable with flange AN9125. A flush stream also is available.

Ross & Associates, Inc., 410 Lexington Ave., New York 17, N. Y.

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J-34-10-10



FINANCIAL				
Projected Sales and Earnings				
1951 and 1952				
	Estimated Sales 1951	1952	Estimated Earnings 1951	1952
	(\$millions)		(per common share)	
AIRCRAFT				
Boeing	\$100	\$410	\$6.00	\$8.00
Curtis-Wright	197	315	30	110
Douglas	180	370	175	980
Grumman	160	275	325	980
Lockheed	225	310	11	400
Martin	60	115	47	80
North American	190	360	215	275
Republic	110	140	310	400
United Aircraft	375	405	325	375
AIRLINES				
American	141.5	165	175	200
Eastern	101	125	300	151
Norfolk	51	40	141	141
Pan American	200	230	80	140
TWA	151	145	170	125
United	125	140	375	425

Tomorrow Will Be Still Better

'Substantial increase in profits,' is conclusion of Value Line survey of aviation prospects through 1952.

An audacious look into the future, projecting 1951 and 1952 sales and earnings for fifteen leading aviation companies, is attempted in a current report being released by the Value Line, an investment advisory agency.

• **Glenn A. Martin.** The position and outlook of the aircraft and engine groups are viewed as a positive in the individual forecasts.

• **Manufacturers.** In discussing the aircraft builders, Value Line declares: "As aircraft production advances at tempo next year, substantial income gains are to be reported by most companies. However, advances at the net income level will be limited by heavier research expenditures, government regulations and pressures, extensive subcontracting networks and normal profit trends at the maximum rate of 75%." Even so, all companies are expected to show substantial increases in profits.

• **Current.** In looking at the air transport group, Value Line also takes an optimistic view. "Many air transport companies will be reporting record profits this year. Furthermore, still larger earnings are in prospect for 1952.

The statistical background is therefore distinctly favorable. In a broad sense, the current earning power of the industry is limited by present fleet capacity." In taking a look at 1952 airline pro-

spects, the investment service asserts that "Substantial gains in operating resources and well-managed profit margins should follow a further increase in per-tonne revenue for the industry next year."

"The resulting expansion in revenues promises to offset increased wage and supply costs which have developed during 1951. Thus, profit margins should continue favorable."

The accompanying table summarizes 1951 and 1952 projections as to both sales and earnings for the nine aircraft and air airline companies reviewed by Value Line. On an overall basis, all companies and earnings for 1952 are expected to surpass corresponding results for 1951.

The separate observations of the advisory service on each of these companies are significant and are excerpted as follows:

• **Boeing.** Earnings are rising well below the record 1948 rate. Boeing's cost airplane manufacturing companies, has been affected by price-downs and subcontracts in its operations. Work on the B-52A assault bomber production for several years ahead at least.

• **Curtis-Wright.** Engine production

of the Wright Aero division represents the chief source of earnings for Curtis-Wright. The aircraft operations this year has been a protracted period of plant rearrangement and tooling-up in preparation for mass production of the J-45 engine jet engine.

It is expected that all operations on this new product will be attained by 1952. These should be a corresponding improvement in earnings of the company.

• **Douglas Aircraft.** A shortage of component materials (which has plagued most aircraft manufacturers) caused Douglas' operations at the third fiscal quarter (3 months ended Aug. 31) to decline somewhat. After normal at profits times at a 63-cent rate, sales volume was at the lowest level in 18 months. Long-term prospects for sales and profits are quite favorable.

• **Grumman.** Formerly a Naval contractor, Grumman has been brought to the economics of aircraft scheduling and, therefore, has not been affected to the same measure as the rest of the industry by aircraft shortages and but steady production progress.

• **Lockheed.** In line with an industry-wide trend, Lockheed's production in recent months has been handicapped by a shortage of engines. Production of airplanes has been temporarily curtailed until powerplant manufacturers can supply the necessary engine to meet plant output.

• **Glenn A. Martin.** A return to profitable operation is in prospect in 1952. However, reorganization of divided parent appears remote, due to the poor earnings record of recent years and the dividend restrictions written into the company's loan arrangements. Martin is the only engine assembly manufacturing company which will have substantial carryforward losses to shield it from income tax liability in 1952.

• **North American Aviation.** North American Aviation has been handicapped at its recent operations by failure of subcontractors to deliver on schedule various types of electronic equipment for installation in its planes. As a consequence, a surplus of airplanes has had to be set back temporarily to the level of suppliers' component production.

• **Republic Aviation.** Supply difficulties are believed to have retarded at the current quarter. As previously planned, Republic's present contracts are concentrated on a single plane type, the F-84 series. For this reason, the long-term position of the company does not appear to be as favorable as it is well known as in the case of other aircraft manufacturers which are currently manufacturing several series of planes for the military.

• **United Aircraft.** Operations in the

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How Many Exits for Air Coaches?

CAB sets pattern for new transport designs, but present planes must await findings of study group.

A Nov. 29 deadline has been set for a joint CAA/CAB study group to submit recommendations on how many additional exits should be required in airline transports if presently approved air coach aircraft density is increased.

Meanwhile, CAB has adopted a new regulation setting emergency exit specifications for any new transport design introduced in the future. It does not affect any of the present air order designs. Convair 440, Douglas DC-68, Lockheed 1049 or Martin 404-B will affect design of future aircraft

models and modifications not yet on order.

► Ed: Fonseca—Focusing CAA/CAB division on air coach exits will affect any airline that plans to increase the number of seats in a transport above the density already CAA approved. For instance, American Airlines flies a 70-passenger version of the DC-6 in its transcontinental air coach.

If American wanted to increase seating to 80 or more passengers for short haul coach, the airline would have to use the exit formula now in the

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WHEELS AND BRAKES

MECHANICAL COMPONENTS

Personnel are needed in the following classifications:

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RAFTSMEN

PHYSICISTS

MATHEMATICIANS

DEVELOPMENT ENGINEERS

TOOL ENGINEERS

STRESS AND WEIGHT ANALYSTS

Practice experience and formal education desirable. However, applicants without formal education but with equivalent practical experience in aircraft engineering fields will be given consideration.

You are invited to investigate these opportunities by submitting a resume of your qualifications and experience to be considered for an opportunity which will be given prompt and serious consideration.

Address all correspondence to
Mr. C. G. Jones, Salary Personnel Department

GOOD YEAR
AIRCRAFT CORPORATION
AKRON 15, OHIO

Searchlight Section Continued on Page 76

Listen, partner, how much
SCRAP have you turned in
this week?



Today, the steel business is your business —it needs all your **SCRAP**, Now!

Suppose that every steel user were suddenly told that he had to turn in a half-ton of scrap before he could get a ton of steel. It would start the steel gods slightly nervous about scrap that ever happened.

In effect, this "no-scrap, no-steel" situation virtually exists. For without all the scrap this industry can scavenge out and start on its way to the mills, steel production will surely drop. It's as obvious as that.

More scrap is urgently needed. Today the mills are turning out more steel than ever before. But they're scraping the bottom of the barrel as far as scrap is concerned. Defense and domestic demands for steel simply

cannot be met unless at least 100,000 tons of "year-classed" scrap roll into the furnace—every day.

The bulk of this scrap must come from industry. That's why we're asking for your all-out help. That's why it's so important that you make the drive for scrap part of your daily operations. Make it your business to encourage every employee to report any obsolete, broken or worn-out machinery, tool or equipment that has worn its day. From the derelict "junk" road come the heavy melting scrap that the mills need most. Don't let your scrap lie idle, send it on its way. How about it, partner?

This page would ordinarily be used to tell you about
U-S-S CARILLOY STEELS

but, because without SCRAP we cannot produce steel,
we are asking instead for your all-out help in getting
more SCRAP to the mills.

UNITED STATES STEEL COMPANY, PITTSBURGH, OHIO
THOMSON STEEL COMPANY, PITTSBURGH, OHIO
UNITED STATES STEEL COMPANY, PITTSBURGH, OHIO
UNITED STATES STEEL COMPANY, PITTSBURGH, OHIO



UNITED STATES STEEL

transported 17,160 tons of scrap compared to 22,368 tons in 1949.

This was a jump of 1,000 tons during the year, and reflects the extensive promotion campaign being made by the airlines to secure more air scrap business.

Alaska Airlines also increased, from 1,975 tons in 1949 to 2,437 tons in 1950.

Volume during the second half of the year is likely to exceed the first six months' record through further development of night flying, completion of the Leda tape deck at Homer, Alaska, which will go into operation in October, and purchase by Alaska of Golub's second largest airline, Loma.

Short-Haul Copter Service Need Cited

Within 20 years, some 10% of the 2.5 million annual airline passengers traveling in and from airports in the New York metropolitan area would use helicopter transportation, if it were available—mutually agreed if some form of subsidy would ensure development of large rotary-wing aircraft before that time.

That was the firmly expressed opinion of Fort of New York Authority Director Fred M. Glus before the Radio Technical Commission for Aeronautics recently.

As it is easier to those who wonder why passenger-carrying helicopters airlines have not sprung up overnight in recent years, Glus said that the present type helicopter, without subsidy, is capable of making only small numbers of direct and direct haul routes with useful load service, such as New York-Philadelphia and Chicago-Milwaukee.

But, according to Glus the caliber of their particular services is better than average; these are often more typical of the average that offer good possibilities for use of rotary transportation.

He cited, for example, the Washington-Norfolk run, where it takes a rail passenger 5 hr. 20 min. slipped time to go only 145 mi. between New York and Norfolk, Mass., where the train takes 4 hr. 13 min. slipped time to cover only 135 mi. "There are many Washington-Norfolk and New York-Pittsburgh segments in the country," Glus declared.

Conventional aircraft services also have their drawbacks, especially on the short-haul time-ground times at each end of such major short-haul routes as New York-Pittsburgh, which always equal and many times exceed air travel, if travelers who go by plane instead of train or bus, he said.

Alaskan Airline Gets \$700,000 RFC Loan

Norfolk Consolidated Airlines of Anchorage, Alaska, has obtained a seven-year loan totaling \$705,530 from the RFC for purchase of equipment and terminal improvements. It has committed \$102,530 for the purchase of equipment; \$215,000 for a hangar, operations and general office buildings at Anchorage; \$50,000 for operational quarters and waiting rooms at King Salmon and Dillingham; \$100,000 for working capital; and \$40,000 for two post office quarters at Fairbanks.

Organized four years ago by a group of Alaskan bush pilots, the line serves routes of communication in western Alaska. It has 15 planes, including three DC-3s, two C46s and a PBV. Seattle, Wash., RFC office says loan was granted because defense contractors in remote parts of Alaska are dependent 100% upon the airline during war months of the year.

New Italian Airline Establishes Routes

(McGraw-Hill World News)

Rome-Thrace Airways Co. has been incorporated at Trieste for international airline operation serving Athens-Cyprus-Berlin, Vienna-Geneva and Agios-Belgrade.

Early service to New York, with intermediate stops, is planned. First flights will start from Rome-Athens in the first week of January, but operations later will be moved to a new international airport at Pescara, located in the Anglo-American zone of the Free Territory of Trieste.

Managing director and general manager of the new company is Capt. Ignazio Zappalà, former pilot and commander of a British airline. First operations approval will be up to the Allied Military Government.

(Shortlines appear on page 80)

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Alex

Sky-high in Quality!

CHAMBERLAIN AVIATION, INC.

ASTON, N. DAK.

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for

**LONG-RANGE MILITARY
AIRCRAFT PROGRAM**

by
**NORTH AMERICAN
AVIATION, INC.**

Los Angeles, California
Columbus, Ohio

Unusual opportunities for Aero-dynamists, Stress Engineers, Aircraft Designers and Draftsmen, and specialists in all phases of aircraft engineering. Engineering skills other than aircraft may be adaptable through paid training program. Also openings for Recent Engineering College and Technological Graduates.

Long-range military program offers fine chance for establishing career in aircraft while aiding defense effort. Transportation and established training time paid. Salaries commensurate with experience and ability.

Please include summary of education and experience in reply to:

Engineering Personnel Office
SECTION 8

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Los Angeles International Airport
Los Angeles 45, Calif.
Columbus 16, Ohio

Wanted ENGINEERS AND SCIENTISTS

Unusual opportunities for understanding and experienced men

These are the positions for which positions and positions are in the field of the design and development of aircraft and spacecraft.

Immediate positions include:
Aircraft project engineers
Aircraft instrumentation engineers
Radio engineers
Flight test engineers
Structural engineers
Aero and thermodynamics
Aero-mechanics
Power plant mechanical designers
Thermal engineers
Electrical mechanical designers
Aircraft maintenance designers

Successful candidates in the field of the design and development of aircraft and spacecraft are in the field of the design and development of aircraft and spacecraft.

We have the positions for which positions and positions are in the field of the design and development of aircraft and spacecraft.

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1905 S. Broadway
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Positions are available for Major and minor positions in the field of the design and development of aircraft and spacecraft.

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SERVO ENGINEERS
JUNIOR ENGINEERS

New and expanding division of an established firm with 50 years of successful experience in the aircraft field. Work involved deals with the manufacture and development of highly complex equipment of the most advanced type.

Write or Apply
AC Spark Plug Division
GENERAL MOTORS CORPORATION
1935 E. Kew-Bird Place
Milwaukee 2, Wisconsin

DESIGN ENGINEERS WANTED GAS TURBINE and Afterburner Research Established 1927



Wanted at Once: DESIGN ENGINEER A and B. DESIGN ENGINEER B. Research and development for the design and development of gas turbine and afterburner research. Established 1927.

Work for a great, strong Company where Research is important. Solar Aircraft Company is in the field of the design and development of aircraft and spacecraft. We have the positions for which positions and positions are in the field of the design and development of aircraft and spacecraft.

**DIRECTOR, INDUSTRIAL RELATIONS
SOLAR AIRCRAFT COMPANY**
Main Plant and West Office
San Diego 15, California

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Unusual opportunities for important work on HELICOPTER transmission systems

Also
many openings for qualified
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DESIGNERS DRAFTSMEN CHECKERS LOFTSMEN

Send detailed resume to

Personal Manager
KAMAN AIRCRAFT CORP.
WINDSOR LOCKS, CONN.



Needed Now!
Structures Engineers
Openings in all departments of the Martin Aircraft Company. We are looking for experienced and talented people to join our team. Write for details to: **Admission to Martin Aircraft**

THE OLSON & MATHIS CO.
Personnel Dept. - Buffalo 2, NY



McDONNELL AIRCRAFT CORPORATION has openings for the following positions:

PROJECT AERODYNAMICIST — HELICOPTER. Five years of aerodynamic experience required, including a minimum of three years in helicopter aerodynamics for work on long range development of high performance transport, liaison helicopters, cargo helicopters, and convertiplanes.

SENIOR AERODYNAMICIST — HELICOPTER. Four years of aerodynamic experience required, including a minimum of two years in helicopter aerodynamics for work on long range development of high performance transport, liaison helicopters, cargo helicopters, and convertiplanes.

AERODYNAMICIST — AIRPLANE. Two years of aerodynamic experience required in either subsonic, transonic or supersonic aerodynamics for work on high performance military airplanes.

STRUCTURES ENGINEER — AIRPLANE. Two years or more of experience required in either stress analysis, air loads, or physical testing for work on high performance military airplanes.

FLUTTER AND VIBRATION SPECIALISTS — MISSILE. Two years or more of experience in the

techniques of conventional flutter and vibration analysis and interested in investigations concerned with the interaction between aerodynamic elastic and guidance and control equipment for missile dynamics — MISSILE. Openings are available for young men interested in the analytical work and wind tunnel work associated with the analysis and synthesis of complete loop control systems, with dynamic systems, flutter and vibration and with stability analysis of power control actuators for missiles for jobs in an engineering or physics degree, or degree in electrical and mechanical work, and an above-average proficiency in mathematics and statistics.

DESIGN ENGINEER — AIRPLANE AND MISSILE. Two to five years of aircraft or missile design experience in airplane structure, equipment installation, component mechanisms, or power plant installation.

These persons possessing the qualifications listed above and who are interested in associating with a young progressive company are invited to contact the Personnel Placement Supervisor.



ENGINEERING DESIGN SUPERVISOR

Openings in all departments of the McDonnell Aircraft Corporation. We are looking for experienced and talented people to join our team. Write for details to: **Admission to McDonnell Aircraft**

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Complete trans-Atlantic, including ADF, VHF, ILS, Auto-pilot & De-icers
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Opening exists in Aerodynamic Department for qualified engineer to assume responsibilities for prediction of temperature and heat loads, and evaluation of flight data for a variety of aircraft and aircraft. Most have experience or potential interest in this field. Opportunity for work on study of methods. Excellent salary commensurate with experience and education.

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Aerodynamic Engineering Personnel

BELL Aircraft
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LETTERS

The Raymond Paper

Every now and then we find an article in *Aeronautics* which we feel is perhaps worth preserving for future reference. The series of dispatches concerned with the Arthur E. Raymond paper entitled "The Wall-Toussaud Accident," is such an article. We would be grateful to you if you would forward a reprint of the complete series of articles.

Arthur J. Harris, Administrative Assistant
General International Inc.
6020 Louisiana Ave.
Dallas 5, Tex.

I write with interest the series of articles under the general heading "The Wall-Toussaud Accident" which appear in *Aeronautics* from Oct. 15, 22 and Nov. 5. It has about it a report of the times available, I would appreciate receiving a copy.

W. H. Fries, Sales Manager
Polytechnic Aircraft &
Development Co., Inc.
281 Wilton St.
Brooklyn 1, N. Y.

Airplane Noise

I wish to congratulate you on the excellent article (Cody's Viewpoint) in the Oct. 15 issue by R. G. Johnson.

The noise problem is much greater than most people in the aviation industry realize, especially the aircraft and engine manufacturers. They have made NIOS attempt to do anything about it, in small engines, personal and business planes, but have spent planes in 1940 and 1941 that since the war the only solution is to change the plane and that can be done if we insist on, or have to. Unless it is done, and done soon, all planes are going to be banned to the side where they will be of no practical use to anyone and it will be impossible to run an airport at any reasonable distance from a residential area.

I hope to see reprints of this article in every aviation magazine and paper in the United States.

Edward C. Walker, Jr., Manager
Los Motos Airport
27th Ave. and Bayshore Hwy.
San Mateo, Calif.

We were interested to read your editorial, "Fusing the Civil's Role," in the Oct. 15 issue. In 1 test I had to find a few in the paragraph in which you say that you are not concerned at this point about the issue the columnist get. They know they are going to get it, they buy their tickets with their own money.

Recently I flew to Brazil and Peru and back in a Constellation, and shortly afterwards I flew to Johannesburg and back in the Comet. You can detect a little bit of prejudice if you like, since I am a de Havilland man, but I do promise you that the Comet was the quietest of the two aircraft.

from the point of view of the traveling passenger.

Furthermore, the absence of vibration in the Comet, which is quite a curious and subtle thing, reflects fatigue on a long journey in a manner that is going to be a revelation to Comet operators. The absence of bumps, though flying so high above the weather, contributes to one's relaxation on board.

But I am only really writing against your reference to some within the cabin.

I agree that the high pitched whine of jet engines is unpleasant to people on the ground. I suspect it can be even more so in-flight than the roar of big radial engines, but airport designers would have to do something about this aspect of localized sound, regardless of the extent of jet aircraft, don't you agree?

Maxwell Saxon, Public Relations Manager
De Havilland Aircraft Co., Ltd.
Hatfield, Hertfordshire, England

(The editorial was concerned solely with the noise problem aspect of the issue paid for this is possibly to be the toughest public relations plan for jet operators.—Ed.)

PAA & Stalls

The article "New Mach Stall Warning" Oct. 15 in *Aeronautics* Week contains a number of misstatements of facts which give a most misleading impression of Pan American World Airways' attitude concerning the use of special stall warning devices on PAA aircraft.

The dissemination and discussion on Sept. 28 which was attended by Captains Pinner and Moss and myself was part of the normal process by which our operators are kept abreast of latest developments in aircraft equipment. In view of current conditions in the Civil Aeronautics Council of CAA (Oct. 15), which might require use of a special warning device on some future aircraft, we have naturally been interested in learning the latest information concerning this type of device.

However, there has been no "demand" for installation of such a device at Pan American Airways until well after the Association of Sept. 28. Furthermore, there is no plan for any test installation on any Pan American aircraft by us or, to our knowledge, by Boeing.

While we have been interested for some time in a project to remove the inherent wing stall problem, the Association, that has been greatly for studies of improving the handling characteristics of the aircraft during takeoff and landing and at no time has there been any proposal for change in the operating limitations of the aircraft. The only plan in progress contemplated has been that due to constraints of the weight of the aircraft which is a result of this study at 40 tons is as a relatively secondary consideration.

With regard to the amount of protest

coming of the Statesman, it should be noted that the aircraft was certified under current CAA requirements, the applicable paragraph of which is 400.152 which reads:

"Climb and descent stall warning shall be provided in the pilot's cockpit at least 15% above the stalling speed, with flap and landing gear in all possible positions, both in straight and in turning flight. It shall be acceptable for the warning to be described either through the reference to dynamic pressure or the airplane, by a rate of stall margin, or by other means which will give clearly distinguishable indication under all expected conditions of flight."

R. W. Bratts, Staff Engineer
Pan American World Airways, Inc.
335 E. 42nd St.
New York 17, N. Y.

A Quotation's Origin

We have noted that the advertisement of the Varian Mfg. Co., Inc., Culver City, Calif., in the Oct. 15 *Aeronautics* Week, credits G. A. Smith, president of American Aircraft Inc., with the quote "Aircraft in stall is not inherently dangerous—that like the car, it is totally safe when properly controlled, managed or stopped."

Appreciating your intention to give credit where credit is due, we wish to correct an error which has been passing unnoticed over the years. While Mr. Smith has said it frequently and while it did at one time stand as a slogan at the head of our loose group, Mr. Smith did not originate the quotation.

The credit belongs to Capt. A. G. Low, chief of the British Overseas Insurance Co., Ltd., in London, and we are indebted to Francis Ludlow, now Director of the Flight Safety Foundation, Inc., in New York, for the full story of the quotation's origin.

On one report for distribution of this quotation, Mr. Ludlow recently wrote: "I believe the original quotation read 'Aircraft is inherently safe but to an even greater extent than the car is totally safe when properly controlled or stopped.'"

"Like was contained," Mr. Ludlow wrote, "in a speech delivered in 1932 before the Royal Aeronautical Society by Capt. A. G. Low, chief of the British Overseas Insurance Co. When I read it in 1937 I changed it to read, 'Aircraft is an even greater safety than the car is, inasmuch as it is subject to no aerodynamic conditions in flight' and used it as an illustration of our company, Auto Insurance Underwriters, for about 15 years thereafter."

Somewhere along the line it was given the contribution now most widely quoted. We call this to your attention merely to set the record straight as Mr. Smith is kindly anxious to see that credit is given to whom credit is due.

ROBERT E. STRICKLAND, Manager
of Sales Section
American Aircraft
190 York Ave.
New York 17, N. Y.



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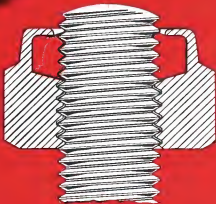
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